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International Conference on Bednets
and Other Insecticide-Treated Materials
for the Prevention of Malaria

October 29-31 1997
Washington, D C

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Rapporteur

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| Pages 16-18 | Trevor Penhallrick, Group Africa |

Preface

On October 29-31, 1997, the U.S. Agency for International Development (USAID) hosted an International Conference on Bednets and Other Insecticide-Treated Materials (ITMs) attended by 163 participants. The conference brought together a diverse group of public health practitioners, private sector representatives, and international donors from 32 different countries (22 of them in Africa), 22 commercial firms, 22 NGOs, and 10 international organizations (See Annex 1 for a complete list of participants).

The conference participants came from many different places and represented a broad range of experiences, yet they were united by a shared commitment to the prevention and control of malaria, as well as an understanding that this battle is at a cross-roads, especially in Africa where the emergence of drug resistant strains of malaria and the spreading of the disease to areas previously malaria free has made prevention critical. During two and a half days the participants shared the lessons they had learned in addressing the challenge of ITMs—with special focus on their application in Africa.

Until recently, the prevention of malaria has been impeded by the lack of simple and effective tools. However, successful field trials in Africa of ITMs, such as bednets and curtains, have offered new hope. While bednets have long been used as a form of personal protection against malaria, the innovative twist of treating the materials with insecticide has been shown to contribute to a dramatic reduction in mortality.

The promise of ITMs is great, yet persons and organizations committed to reducing the disease burden of malaria are struggling with how to meet the full potential of this technology in the face of seemingly insurmountable social and economic impediments. Experience—with ITMs and other health interventions—strongly suggests that the success of ITM programs will depend on achieving sustained public demand for, access to, and appropriate use of affordable netting and insecticides. New models for the social marketing, behavior promotion, financing and distribution of netting and insecticides are needed. Meeting the challenge of voluntary acquisition and use also requires a re-examination of the roles and relationships of the public sector, the commercial sector, and the community.

This report is a summary of conference presentations and small group discussions and report-outs. The conference examined what we currently know—based on lessons learned from field experiences with ITMs or other sectors—and how best to meet the challenges of demand, access, affordability and appropriate use of ITMs.

Because this summary is limited to reporting on the conference alone and does not include information from other sources, it makes no claim to be a comprehensive treatment of the topic of ITMs. However, as you read this document, consider it as the initial input for a comprehensive handbook presently under development by USAID for use by programmers and planners on the when, where, and how of implementing an ITM program. The planned handbook will summarize our collective experience and lay out options for planners when faced with specific situations—options that have been used successfully by others under similar circumstances.

I would like to acknowledge that, in addition to USAID, nine other private-sector and donor organizations co-sponsored the conference

AgrEvo
American Cyanamid
Bayer AG
Malaria Consortium
Rotary Clubs Against Malaria

Siam Dutch
UNICEF
WHO
Zeneca

In closing, I would like to thank Dr Sylvia Meek from the London School of Hygiene and Tropical Medicine/Malaria Consortium for co-moderating the conference with me

– *Dennis Carroll, USAID*
Conference Co-Moderator

Acknowledgements

I would like to acknowledge the following individuals for their contributions to the planning and implementation of the ITM conference: Kathy Alison and Edward Salt from Training Resources Group, Desmond Chavasse, Jenny Hill, Jo Lines, Sylvia Meek, and Sunil Mehra from the London School for Hygiene and Tropical Medicine, John Paul Clark from USAID's Africa Bureau, Catherine Reed from PATH Canada, Jane Zucker from UNICEF, Jaqueline Cattaru from World Health Organization, Charles Gursky and Gerhard Hesse from Bayer AG, and David McGuire, Michael Macdonald, and Marcia Rock from USAID's BASICS Project.

USAID's Environmental Health Project provided logistical, administrative, and editorial support to the conference. Special thanks go to Fred Rosensweig, David Fernandes, Karen Ramsey, Pamela DeWitt, and Sharon Gillespie for seeing that the conference ran smoothly, to Diane Bendahmane for writing the report and to Betsy Reddaway and Darlene Summers for editorial and production support, and to Dan Campbell for assisting with background research and preparation of the bibliography.

– *Dennis Carroll, USAID
Conference Co-Moderator*

I. Background

The lack of suitable options for prevention is a major constraint facing national and international programs to reduce the burden of malaria, especially among children and pregnant women. Trials of insecticide-treated mosquito nets conducted recently in East and West Africa have demonstrated that this simple technology can reduce deaths among young children, not just from malaria, but from all causes. These were mainly controlled trials in which mosquito nets and insecticide were distributed for free. How effective bednets and other insecticide-treated materials, such as curtains, would be under conditions of *voluntary acquisition and use* is less clear.

To examine this and other questions related to insecticide-treated materials (ITMs), USAID hosted an international conference bringing together

- Malaria control program managers and other public health practitioners from Africa, Asia, Europe, and the United States
- Private-sector manufacturers of netting materials and insecticides
- Representatives from nongovernmental organizations (NGOs) and international donors

This report summarizes the work of the conference.

1.1 Conference Goals

The purpose of the conference was to create a stage where a diverse group of public health practitioners, private sector representatives and international donors could share the lessons learned to date in addressing these challenges and to explore how these lessons could be applied operationally.

Three outcomes were anticipated:

- Input for a handbook to be used by programmers and planners from the public sector, NGOs, etc. on the when, where, and how of implementing an ITM program. It will summarize what is known (experience and lessons learned), what is not known (questions that need to be answered in the next few years), and what options for action exist (the guide will not be prescriptive, there is not just one right way to plan and carry out an ITM program).
- An initial framework for ITM planners to use for monitoring the progress of their programs.
- Development of a new partnership between the private and public sectors in the planning and implementation of ITM programs.

Other goals articulated by conference participants included:

- A mechanism for information sharing and coordination of ITM activities among the conference participants—even after the end of the conference.
- A clear statement of next steps to be acted on following the closure of the conference.

1.2 Conference Design

The conference combined plenary and small group sessions. Participants were asked to work in groups to examine ITM programs from two completely different perspectives: first from the perspective of four key themes (demand, access, affordability, and appropriate use) (see Box 1-1), and then from a programming perspective. They discussed how the four themes applied to each step in the programming process—assessment, planning, implementation, and monitoring and evaluation. All small group sessions were facilitated and each group had a technical moderator and rapporteur. The conference

Box 1-1 Conference Themes

- ◆ *Public Demand* At present, demand for insecticides, bednets, and other insecticide-treated materials is marginal in the region. What little demand exists is for mosquito netting. There is no history of personal use of insecticides for treatment of bednets.
- ◆ *Access* Bednets are generally available only in urban areas—if at all—and no organized public or private systems exist for delivery of insecticide services for treatment of nets.
- ◆ *Affordability* In many places, bednets currently cost \$10 to \$25, and insecticide treatments \$1 to \$2 per year. The typical household is likely to need three or four bednets. This means that the use of insecticide-treated bednets could be unaffordable for most households.
- ◆ *Appropriate Use* A number of ingrained behavioral and social patterns strongly influence appropriate use of bednets. Ensuring that the right populations use the nets (children under the age of five years and pregnant women) and use them correctly requires promotional efforts that adequately take into account local factors.

program is included here as Annex 2 and the letter of invitation and registration packet as Annex 3.

Two events brought participants together outside the conference halls. The first was a poster session on the evening of the first day. Eighteen posters were presented. Poster session abstracts may be found in Annex 4. The second event was a reception on Capitol Hill hosted by Senator Patrick J. Leahy of Vermont and funded by Bayer AG.

1.3 Context

USAID promotion of bednets and other insecticide-treated materials is in the context of the agency's overall malaria control strategy for Africa. As articulated in the agency's *Integrated Malaria Control Strategy*, the goal of USAID malaria programs is to mitigate the

impact of malaria on sustainable development through strengthening the capacity of developing African countries to reduce mortality and severe morbidity among high-risk groups, particularly infants, children under five years of age, pregnant women, and migrants and other displaced populations.

To meet the challenge of malaria in Sub-Saharan Africa, the strategy promotes three areas critical to reducing the malaria burden:

- Preventing infection and managing malaria-related illness
- Building sustainable malaria control programs
- Developing new technologies and approaches for malaria control

At the core of the strategy's approach is a package of proven maternal and child health interventions for malaria prevention and control, with particular emphasis on strengthening:

- The diagnosis and treatment of malaria at the health facility
- Early recognition in the home of malaria illness and appropriate health-seeking behavior by the caretaker
- Chemoprophylaxis for pregnant women
- Increased access to and appropriate use of insecticide-impregnated mosquito nets

The conference may also be viewed in the context of the infectious diseases strategy being developed by USAID in response to a Congressional mandate. Congress has allocated additional funds to USAID to address the infectious diseases problem, Senator Leahy was instrumental in raising the problem in Congress (Remarks made by Senator Leahy's aide, Tim Reiser, at the opening of the conference are to be found in Annex 5.) The new strategy will focus on malaria, tuberculosis, anti-microbial resistance, and surveillance.

1.4 How This Report Is Organized

Following a preface and this introduction, which provide background on the conference and its goals and organization, are three additional chapters, a bibliography, and a number of annexes

Chapter 2 — summaries of the opening plenary presentations

Chapter 3 — summaries of the small group work discussions

Chapter 4 — final report-outs of the small groups and closing plenary remarks by USAID

Administrator J Brian Atwood and Dennis Carroll

Annexes include the conference program, letter of invitation, registration packet, participant list, and poster-session abstracts, as well as some additional background documents and miscellaneous notes

II. Plenary Presentations

The opening plenary began with presentations on the current status of ITM programs a review of bednet trials and the experience of ITMs in Africa* Five additional presentations were given on the four conference themes demand, access, affordability, and appropriate use Following the plenary, the conference divided into small work groups to consider the themes in depth and to relate them to the programming process Chapter III summarizes the main output of the work groups, this Chapter summarizes the formal presentations

2.1 Review of Bednet Trials: Summary of the Presentation by Christian Lengeler (Swiss Tropical Institute)

Mosquito nets are not a new idea since they have been used for thousands of years already, but the idea to combine them with a residual insecticide goes back to World War II In the late 1970s, pyrethroids, which are safe for home use, became available, and they made it possible to envisage widespread use of the treated materials

In the 1980s, ITMs were put through a series of successive testing phases, comparable to the development of other health interventions Phase 1 studies confirmed the safety of ITMs and their impact on vector insects Phase 2 trials were small-scale trials often focusing more on the entomological than on the disease impact Finally, Phase 3 clinical trials were started in the mid-1980s to assess impact on malaria at the community level In all these trials the safety and side-effects of ITM were always assessed as well In the late 1980s, a first trial in The Gambia demonstrated

a substantial impact on all-cause child mortality This encouraging result led WHO/TDR to launch and support four additional large-scale trials with mortality as the primary outcome (in The Gambia, Burkina Faso, Ghana, and Kenya)

With the results of these trials being available, it is now time to move on to Phase 4 with work on the effectiveness of ITMs (as opposed to their efficacy) and their long-term impact The crucial area of operationalization and operational research is also becoming a major focus for implementation and research

The current review of all Phase 3 trials has been carried out using the standardized methodological criteria of the Cochrane Collaboration, a large international initiative aiming at reviewing the effects of health care interventions Bednets and curtains were lumped together as "nets," and no distinction was made between the different pyrethroid insecticides However, the analysis has been stratified according to the type of control group (either no nets or untreated nets) Results were further separated into areas with stable malaria transmission (Entomological Inoculation Rate - EIR > 1, essentially Africa and Papua New Guinea) and areas with unstable transmission (EIR < 1, rest of Asia and Latin America) For the latter group, results were divided into impact against *P. falciparum* and *P. vivax* Trial outcomes included essentially impact on all-cause child mortality and incidence of clinical malaria episodes All trials except one assessed impact under trial conditions (efficacy) rather than under program ("real world") conditions (effectiveness) The data for this review are detailed on the CD-ROM of the Cochrane Collaboration (Reference C Lengeler, Insecticide-treated bednets and curtains for malaria control The Cochrane Library, Oxford, Update software, 1998)

Figure 1 summarizes the results of the five trials with overall mortality as the main outcome Four trials were randomized and

*"Bednet" is a generic term meant to refer to bednets and curtains treated with insecticides

controlled while the first trial in The Gambia (Alonso et al) was not randomized. In the two Gambian trials, the control group used untreated nets, while the intervention group had their nets treated. In the three other countries, the control group did not have any net. In the trial settings, there was a wide range of transmission, and the relative protective efficacy (calculated as the percentage of mortality reduction) clearly decreased with increasing malaria transmission.

As a result of this decrease there has been some discussion as to whether the reductions in mortality achieved in Ghana and especially in Burkina Faso were sufficient to justify the large resources needed to implement an ITM program. This question can be answered by looking at the absolute reduction in mortality, as given by the rate difference, this shows directly the number of deaths that can be avoided per year for every 1,000 children protected by ITMs. It is apparent from Figure 1 that the absolute impact is rather similar in the four later trials, while it is much higher (over 17 deaths avoided per year per 1,000 children protected) in the first Gambian trial. This apparent paradox is essentially explained by the fact that mortality increases strongly with increasing transmission (as can be seen from the rates in the control group). Summing the available data shows that overall there is a reduction of 19% in child mortality. This translates into 5.6 deaths averted per year and per 1000 children protected (Figure 2).

The impact of ITMs on the incidence of clinical episodes of malaria is shown in Figure 3 (control group: no nets) and in Figure 4 (control group: untreated nets). For stable malaria areas, treated nets work very well. In Africa there was a 46% (controls: no nets) and 37% (control group: untreated nets) reduction in the number of clinical episodes. In Asia and Latin America there was a 60% and 33% reduction against *P. falciparum* and a 45% and 14% reduction against *P. vivax*. To some extent, the difference in the results between the two groups of controls shows the impact of untreated nets on their own.

The results presented above document the high public health benefits of ITMs and call for their rapid implementation on a large scale in malarious areas.

Two main research issues remain currently:

- The impact of ITMs under program ("real-life") conditions as opposed to scientific trials
- The long-term impact of ITMs in areas of very high transmission (EIR>100) because of the problem of delayed acquisition of immunity. No hard data exist currently on this question, and programs implemented in such zones should include a good monitoring component. However, on the basis of current evidence there is no reason for halting the implementation of ITM programs.

Four conclusions can be drawn from this review of insecticide-treated net trials:

- ITMs have a substantial impact on child mortality in Africa (5.6 deaths averted per 1,000 protected children per year). With 80 million children under age five in Africa, 400,000 deaths could be saved.
- The relative impact seems to decrease with increasing transmission (from 29% to 14%) but this effect is not seen with absolute impact.
- ITMs have a substantial impact on mild disease episodes, with nearly a halving of clinical episodes in Africa.
- The impact within programs and long-term effects still need to be assessed.

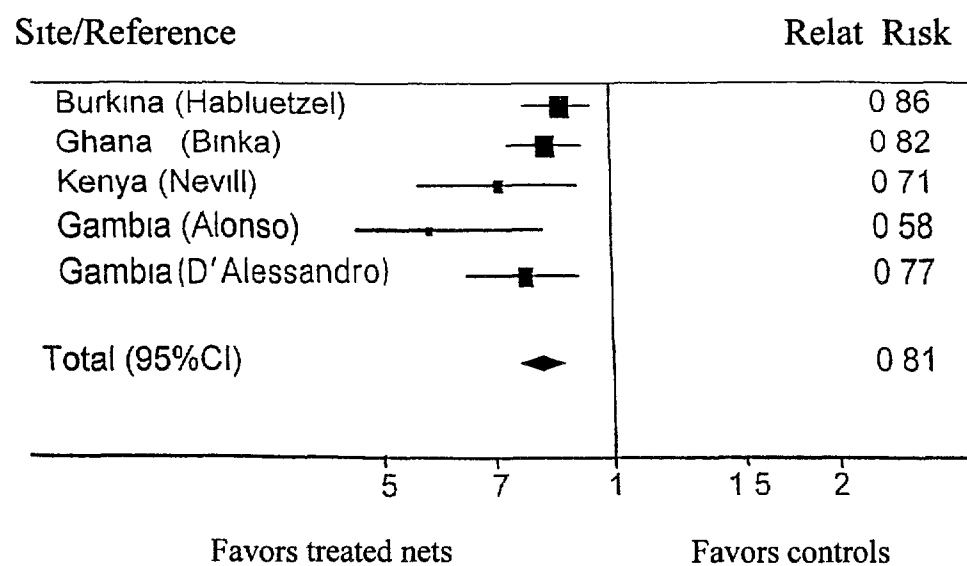
2.2 Overview of Bednet Experience in Africa: Summary of the Presentation by Deogratias Barakamfitrye (WHO)

The overall goal of an ITM program is to reduce the malaria disease burden in Africa. What is this burden? In health facilities, 30% to 50% of the out-patients are sick with malaria.

Figure 1
Results of the Bednet Trials

Country (Reference)	Type of Intervention	Transm intensity (EIR)	Intervention group (death rate/1000)	Control group (death rate/1000)	Protective Efficacy (95% CI)	Risk Difference (death rate/1000)
Gambia (Alonso <i>et al</i> 1991)	Treatment of existing nets	1-10	24.3	42.1	42% (20-61)	17.8
Gambia (d'Alessandro <i>et al</i> 1995)	Treatment of existing nets	1-30	18.7	24.3	23% (1-41)	5.6
Kenya (Nevill <i>et al</i> 1996)	Bednets + insecticide	10-30	9.4	13.2	29% (3-47)	3.8
Ghana (Binka <i>et al</i> 1996)	Bednets + insecticide	100-300	28.4	34.2	18% (1-30)	6.0
Burkina Faso (Habluetzel <i>et al</i> 1997)	Curtains + insecticide	300-500	41.8	48.7	14% (-8-30)	6.9

Figure 2
Outcome of Bednet Trials Reduction in Overall Mortality



Risk Difference 5.6 Deaths/1000/Year

Figure 3
Outcome of Bednet Trials
Impact on Mild Malaria Episodes, Treated Versus No Nets

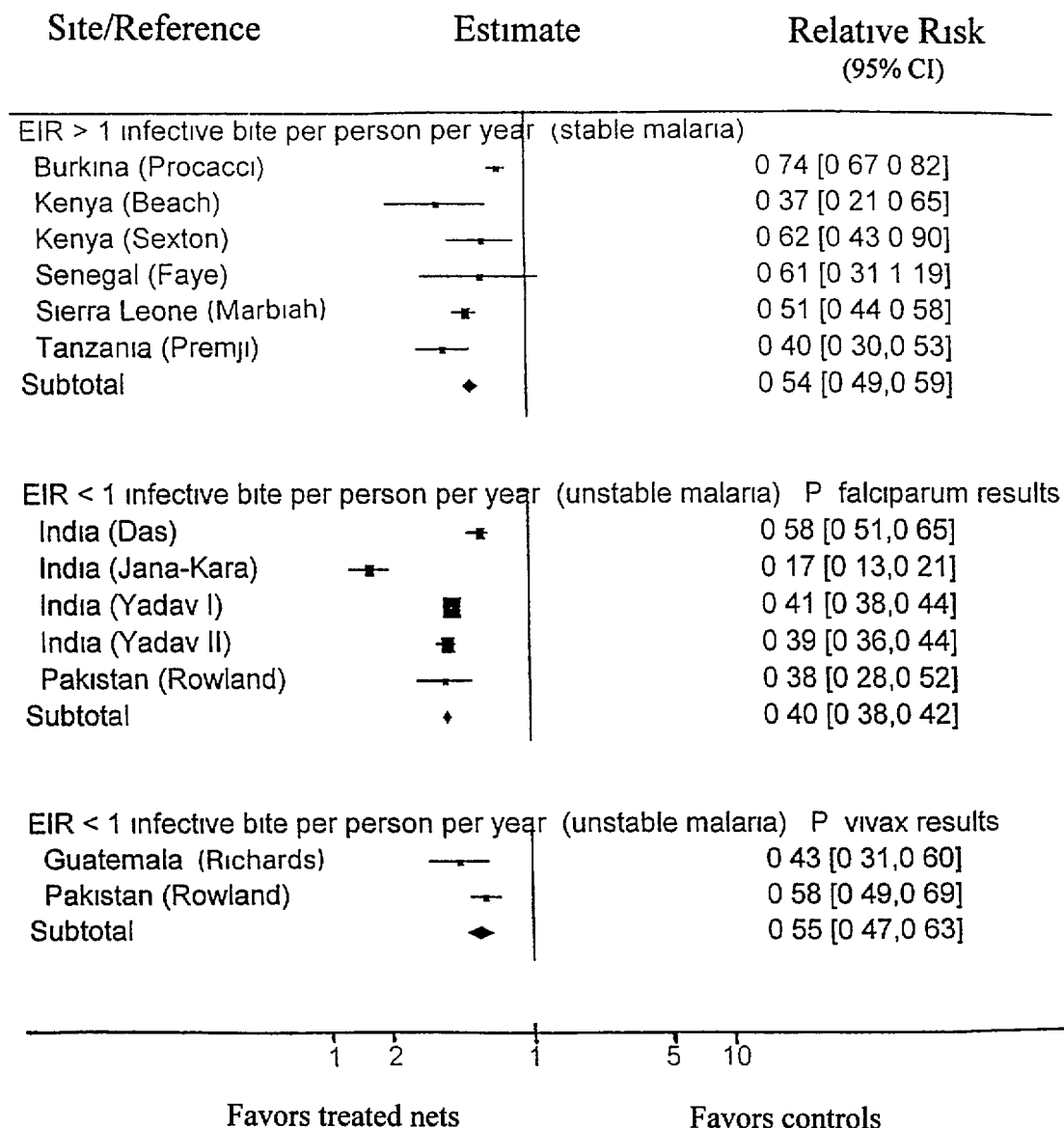
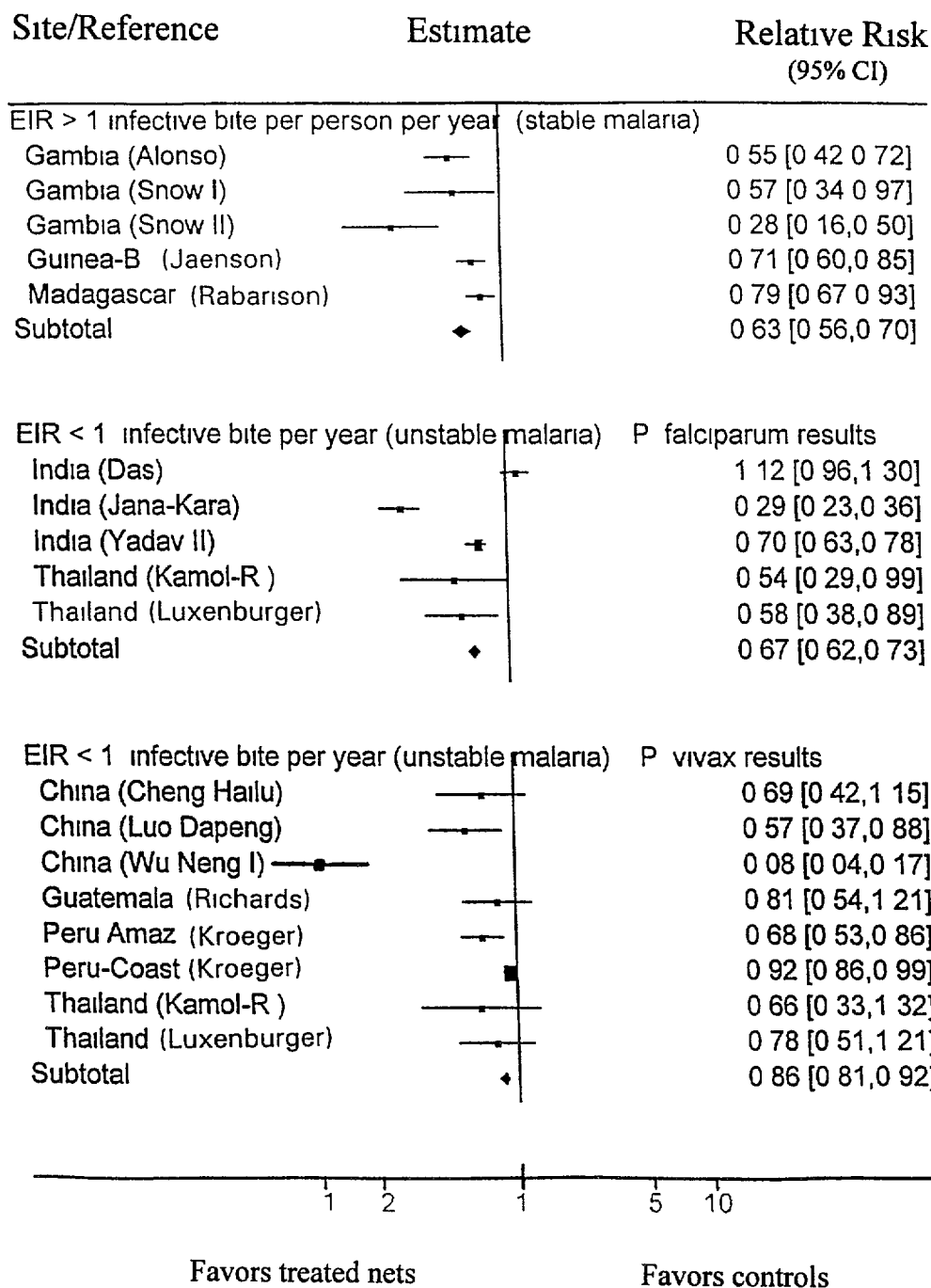


Figure 4
Outcome of Bednet Trials
Impact on Mild Malaria Episodes, Treated Nets Versus Untreated Nets



Case fatality rates for malaria are as high as 40% in some places. Malaria causes 1.5 to 2.7 million deaths per year. Seventy-three percent of the population lives in malaria endemic areas, 18% in epidemic-prone areas. Malaria is responsible for \$1.7 to 2 billion in economic losses every year.

ITMs are one of five components of the Regional Malaria Control Strategy

- Case management
- Personal protection (ITMs)
- Epidemic forecasting, early detection, and control
- Monitoring, evaluation, and operational research
- Integration of activities within primary health care

Malaria control plays a key role among African public health initiatives. It is part of child survival and integrated management of childhood illnesses. There the challenge is to improve care-seeking behavior for fever, improve home management of fever, improve compliance with malaria treatment, and promote the use of ITMs. Malaria control is also part of efforts to control emerging and re-emerging infections. Anti-microbial resistance—the decreasing efficacy of drugs—and the small number of new drugs are serious problems. Successful prevention through the use of ITMs could decrease demand for drugs and perhaps slow development of resistance, if associated with appropriate treatment and compliance. Finally, malaria control is related to the promotion of safe motherhood. Chemoprophylaxis and use of ITMs are recommended for pregnant women.

Experience with the use of bednets is limited in Africa. Gambia is the only country in which ITMs have been used on a wide scale. Other projects are pilots or small-scale. Of the 42 malaria endemic countries, 25 are promoting the use of ITMs, but coverage is low. ITMs are expensive and not widely available. Because experience is limited, we still don't know if ITMs are effective in all

settings and if they reduce mortality or shift it (or both).

The challenge is to make the transition from efficacy trials to sustainable community-based interventions. This will require that ITMs be available, affordable, and acceptable to potential users. Above all, it is necessary to carefully monitor the resistance of the vectors to insecticides used on ITMs. Hopefully, this conference will be the beginning of a strong public-private partnership to address malaria, the most important killer in Africa.

2.3 Conference Themes

2.3.1 Demand Creation: Summary of the Presentations by Marcia Griffith (The Manoff Group) and John Berman (Population Services International)

Marcia Griffith

As we move from efficacy trials to programs, an important issue is creating demand for insecticides and netting. What is demand creation? Our overall goal is to create a culture of ITM use, like the culture of breastfeeding. If demand creation has been successful, people will (1) try an ITM and (2) continue to use it, and (3) use will spread until all participate equably in an ITM culture.

Creating demand focuses on consumers or potential consumers. Their needs and desires must be recognized, understood, and catered to. When it is successful, demand creation enhances the effectiveness and cost-effectiveness of programs. Money and effort spent on infrastructure—in this case on supply of nets and insecticides—without providing for effective demand may be wasted. Trial and sustained use are driven by both supply and demand.

The two basic elements of demand creation are formative research (or market research) and communications. Experts in these two areas can provide ITM programs with a creative spark and can think strategically.

Formative research is consumer-based research. It should be conducted before programs are designed. It allows epidemiologic needs to be balanced with consumer needs, clarifies trade-offs in consumers' minds, and provides information for a host of decisions. Among these are decisions on consumer differences/audience segments, characteristics and price of the product, the best private/public mix for the market and delivery strategy, and the most appropriate communication strategy. Research will provide information on people's perceptions and beliefs about mosquitoes, malaria (how they define the disease), control mechanisms and trade-offs, and insecticides, as well as their use of preventive measures and cultural norms, such as sleeping patterns. Research will also help planners to understand the nature of people's contact with commercial markets, communications media, and public and community programs related to malaria control.

The techniques of formative research are usually qualitative. They include in-depth interviews, focus group discussions, and user-non-user comparisons. TIPs (trials of improved products) can provide a wealth of information.

When formative research is complete, a communications strategy can be designed. Such a strategy should attempt to (1) remove resistance to taking the desired action and (2) heighten motivation for taking action. Consumers should be provided with information about the product and treatment and proper use. Communication strategies can also be directed at the policy level, to advocate for ITMs with public and private leaders.

In the demand creation cycle, the consumer informs decisions on the product, delivery, pricing, and proper use and then communication disseminates these decisions. This cycle must repeat itself as experience is gained and as the program moves from the trial stage to sustained use.

John Berman

Essential information for assessing demand must be collected at several levels before an ITM program can be designed. On the individual/community level, information must be sought on attitudes about and knowledge of malaria transmission, attitudes and practices related to nuisance bites, and disposable income or willingness to pay for ITMs. From a regional or provincial perspective, information is needed on other ITM programs, particularly those that distribute ITMs free or at a highly subsidized price, and on Ministry of Health policy concerning the distribution of nets and retreatment products. It is important to make sure that the Ministry of Health approves the product and strategy before beginning to create demand. National-level issues include knowledge of other demand-creation programs (are their messages compatible with the proposed program?), level of donor and government support, and information about the registration process for the insecticide, including how long it will take, or verification that the insecticide has been registered. Finally, information is needed on private sector involvement: who are the vendors, what volume do they operate at, what are their prices, what is the source of their goods, are they subject to taxes and other duties?

There are pros and cons for the two basic approaches to creating demand: mass media versus interpersonal communication, as shown in the box on the facing page.

Rather than using one approach exclusively, it is wise to strive for a mix.

It is also wise to strive for a mix when deciding whether to create demand for malaria control on the one hand or a good night's sleep on the other. It does not have to be an either-or proposition. If consumers understand the transmission mechanism and the way in which treated nets can limit transmission, they may be more likely to buy and treat nets for

Box 2-1 Two Approaches to Creating Demand

<i>Mass Media</i>	<i>Interpersonal</i>
<p>PROS</p> <ul style="list-style-type: none"> ◆ Wide reach many people have access to radios or newspapers ◆ Low cost per person ◆ Intensive repetition of messages helps to reinforce behavior change <p>CONS</p> <ul style="list-style-type: none"> ◆ Message delivery is not interactive. ◆ Message delivery is less selective everyone hears the same radio spot 	<p>PROS</p> <ul style="list-style-type: none"> ◆ Delivery of message can be interactive (question and answer) ◆ Allows for selective targeting of groups, e g , presentations to school children, mothers, etc <p>CONS</p> <ul style="list-style-type: none"> ◆ Logistics will limit reach message is delivered one person at a time or to small groups ◆ High cost per person reached ◆ Low rate of message repetition

themselves and their children. If consumers value a good night's sleep, and if a treated net reduces biting, this will also motivate them to buy and treat nets. However, the good-night's-sleep motivation might not lead to nets being used for children.

Demand creation experience in other areas, particularly family planning and HIV/AIDS, can be relevant to ITMs. The principles of the process are the same: identification of a target market, development of a message strategy to motivate the target market, and use of a wide range of communications channels.

Experience with large-scale commercial ITM social marketing programs is extremely limited. It may be too early for "lessons learned." However, we do know that in areas where there are significant levels of nuisance bites, selling bednets at reasonable prices is easy. We also know that the transition from free dipping to cost recovery can be difficult. We need more experience. We need to start new and scale up existing operational programs in order to gain experience with demand creation for and distribution of nets and insecticide treated materials.

2.3 2 Accessibility: Summary of the Presentation by Trevor Penhallrick (Group Africa)

The following description of the distribution chain in sub-Saharan Africa is based on information about Nigeria, Uganda, Kenya, Tanzania, Zambia, Malawi, and Zimbabwe, all Anglophone countries in the malaria zone. The population in these countries is still largely rural, as shown in Figure 5. A large percentage of the population subsists on less than one US dollar per day, as shown below.

Nigeria	28.9%
Kenya	50.2%
Uganda	50%
Zambia	84.6%
Zimbabwe	41%

(No data are available for Tanzania and Malawi.)

There are few buses and trucks per 1,000 people compared with developed-country levels. There are 223 buses and trucks per 1,000 people in the United States and about

36 in Germany. The number of buses and trucks per 1,000 people for the seven countries ranges from 1.1 for Uganda to 7.4 for Zambia. The same discrepancy exists in railroad miles per 100 people. In Germany there are 6.95 miles per 100 people, in the United States 5.13. The range for the seven sub-Saharan countries is from 2.1 miles for Nigeria to 1.49 for Zimbabwe. Miles of railroad per 100 square miles range from 3 in Zambia to 1.3 in Malawi, compared with 4.2 in Germany and 38 in the United States. Miles of road per square mile range from 0.8 in Zambia to 3.7 for Zimbabwe,

compared with 2.9 in Germany and 1.1 in the United States. But in Africa only a fraction of the roads are paved: 28% in Nigeria (the highest) down to 4% in Tanzania. In Germany 99% of the roads are paved, in the United States, 89%.

Figure 6 shows the channels of distribution in developed countries. Essentially the flow is from manufacturer or importer to wholesaler, retailer, and finally consumer. In some instances agents, sales representatives, and storage depots may be involved. For perishables the process may be short-circuited.

Figure 5
Population Distribution in Seven African Countries in the Malaria Zone

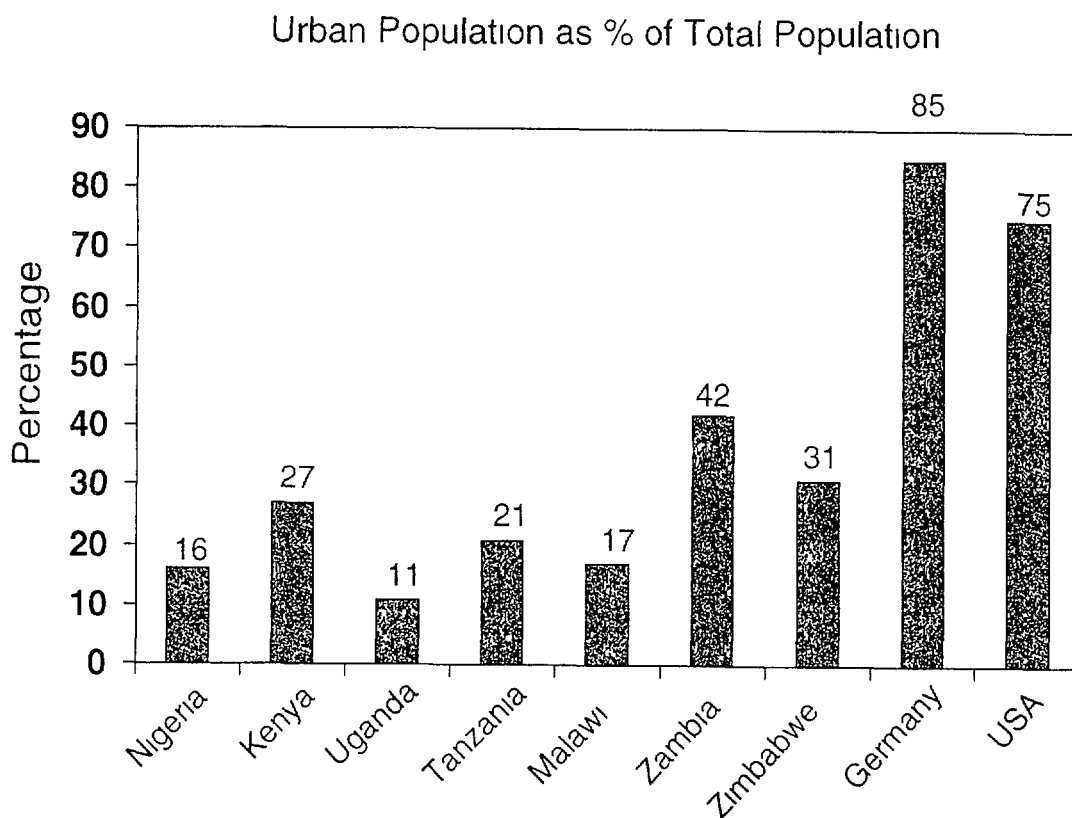
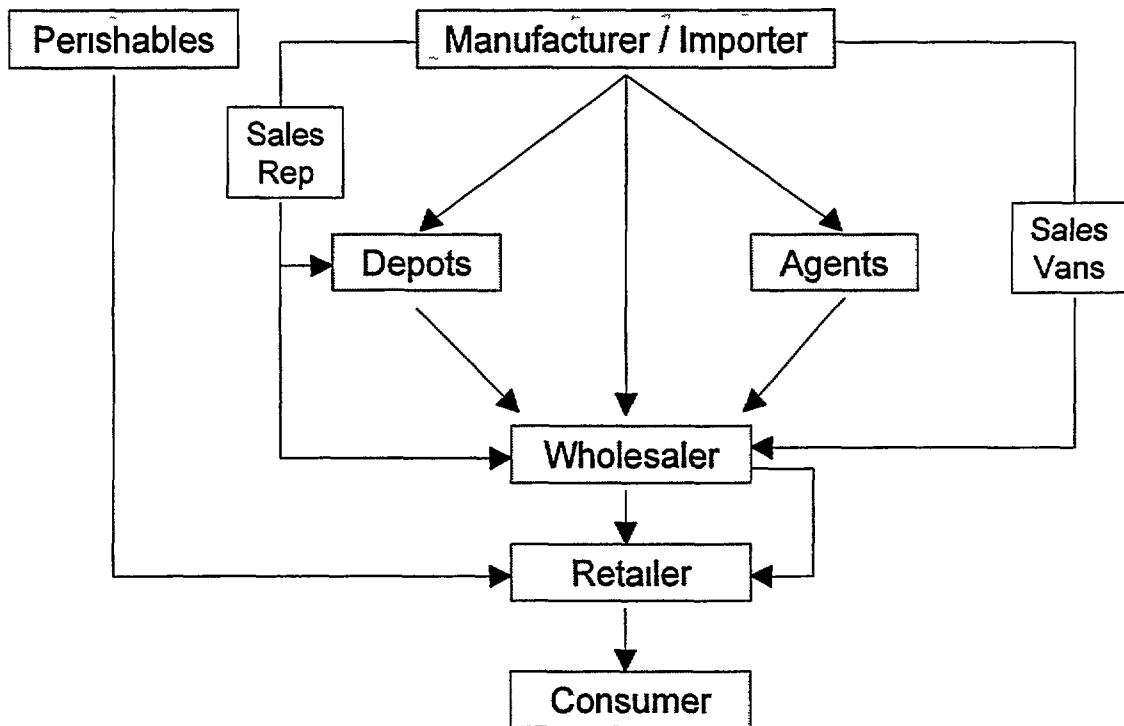


Figure 6
Channels of Distribution in Developed Countries



"Looking at distribution channels in Africa the conclusion is there is a system and it works If it ain't broke, don't fix it "

— Trevor Penhallrick

This distribution plan can be affected by local conditions and may have to be adjusted. Factors as diverse as perceived standards of response, precision, consistency, urgency, competition, service, and communication will impact the distribution plan.

In adjusting the paradigm for Africa, issues around service and communication do confront us. These include:

- The administrative process of getting goods
- Finance—largely on a cash basis
- Bureaucracy—some countries are looking for ways to reduce bureaucracy
- Security—many people are poor and tempted to pilfer
- Physical movement of goods
- Who moves the goods
- The profile of grocery products
- The profile of retail distribution

The photographs on pages 16 to 18 demonstrate how goods are moved in Africa.



Photo 1 Numerous methods of moving goods are shown: a truck with a tarpaulin, a brand-name truck moving product out by going around the distribution chain, people moving goods on carts or on their heads, and buses used to carry many products.

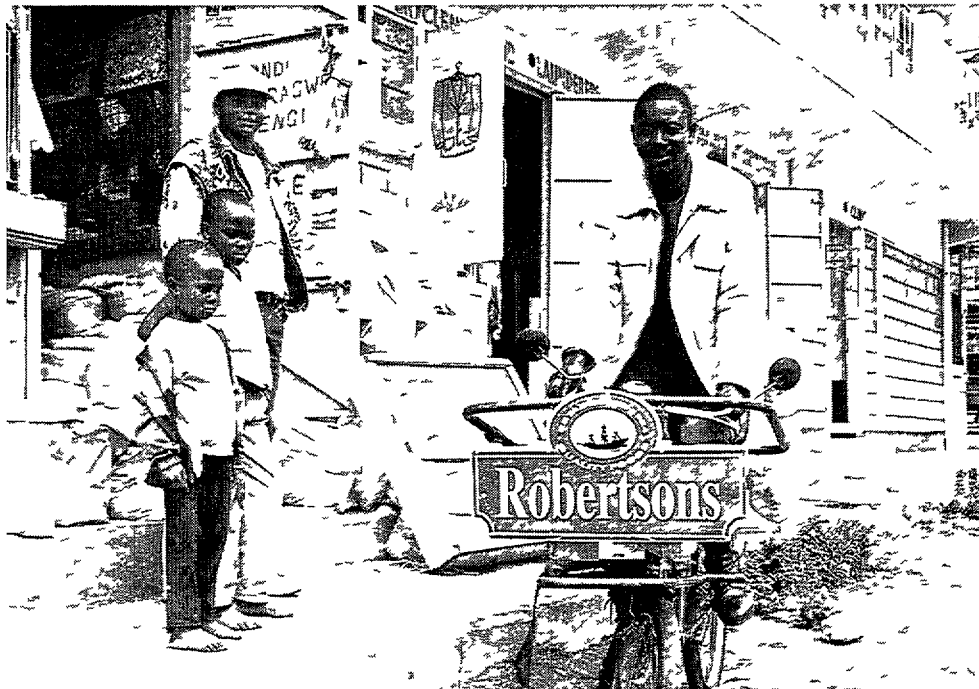


Photo 2 Bicycles are often used for transporting goods



Photo 3 Wholesalers exist but are not common, sometimes wholesale and retail are combined



Photo 4 Packaging must be up to scratch for Africa



Photo 5 Low cash flow limits availability of goods, as shown in this sparsely stocked retail store

In essence they show that the channels of distribution in Africa are the same as everywhere else, except for the addition of hawker, as shown in Figure 7. There is a system and it works, don't tamper with it. But be aware of outstanding issues

- Availability (supply chain support)
- Affordability of product and distribution
- Acceptability (product must be relevant to the communities)

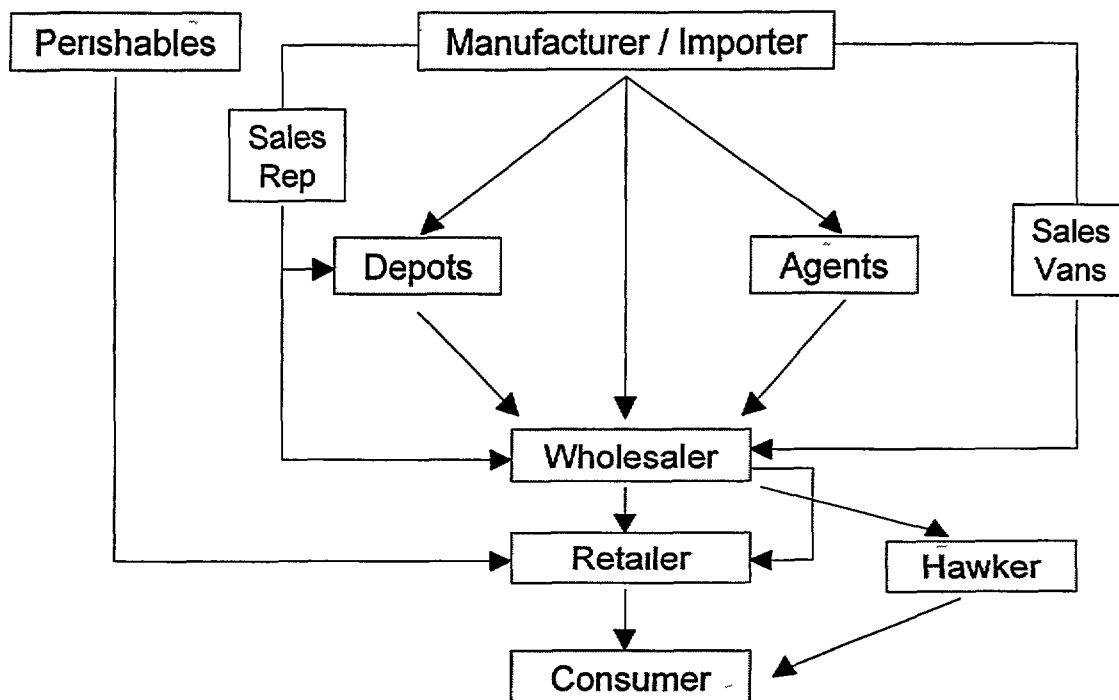
2.3.3 Affordability. Summary of the Presentation by Jane Rowley (MRC Laboratories, Gambia)

Affordability is a key aspect of a successful ITM program. Demand and

availability are necessary elements, but they are not sufficient for success. If people cannot afford the nets and insecticides, then the program won't succeed. People must have the means to purchase them and must regard them as a household priority. However, we should not create a situation in which people switch resources needed for food or other essentials so that they can obtain bednets. Subsidies may be used, but if ITM use is to be sustainable, people must pay a substantial amount toward nets and insecticides.

If bednets are not affordable, alternative materials could be impregnated with insecticides—curtains, for example. Perhaps a transition phase is needed in which programs begin with insecticides, not with bednets.

Figure 7
Channels of Distribution in Africa



Benefits to be expected from use of ITMs are reductions in mortality, in time lost from work, in treatment costs, in expenditures on prevention, in funeral expenditures, and in pressure on drugs and development of drug resistance. ITMs may also reduce head lice and offer some protection from snakes.

A reasonable estimate of the cost of a large-scale ITM program is based on the following assumptions

- Country of 12 million people
- Average of 3 people per bed
- Cost of net = \$4 (excluding local distribution)
- Useful life of net = 4 years
- Nets dipped twice a year
- Annual cost of dipping = \$0.50
- Nets introduced over 4 years

Thus, the cost of the program may be calculated

- 4 million nets would be required
- Cost of nets for first year (1 million X \$4) = \$4 million
- Cost of dipping nets (4 million X \$0.50 X twice a year) = \$2 million
- Total cost = \$6 million
- Annual per capita cost (\$6 million ÷ 12 million) = \$0.50
- In addition, local distribution costs, including profit, must be added. (In Tanzania, adding these costs increased the cost of the net from \$3.60-\$4.20 to \$5.40-\$6.40)

Setting prices is a difficult task, one in which a number of factors should be considered. The objectives of the program will definitely come into play, particularly in decisions about subsidies. In addition, consideration must be given to the amount people are able and willing to pay (this is often quite a lot), the sensitivity of demand to price changes, access to other sources of funds that can be used for subsidies, and the effect of pricing (and subsidies) on long-term sustainability and equity.

The product may have to be distributed initially for free so that people can see its value, subsequently people will have to pay. This was done in Gambia. When people had to pay, there was an initial drop in the number of ITMs distributed, but the number gradually increased.

Affordability may be assessed through market and user surveys, household expenditure surveys, and willingness-to-pay studies, although the latter may be difficult to conduct for a new product whose use and benefits people don't understand. In making these assessments, seasonality of cash availability must be taken into consideration. Often cash is low at the peak mosquito season. Other considerations include household responsibilities for purchasing goods, size of households and sleeping patterns, household expenditure priorities, and the availability of credit schemes or other payment options.

A subsidy is an artificial incentive for lowering the cost of a good. Subsidies can help assure that the nets are being used by targeted groups, but they also have the potential to reduce the customer base for commercial sales.

Payment options can make it more feasible for a family to afford ITMs. Payment may be in-kind rather than cash. Credit schemes or pre-payment plans can also be used.

Several lessons about affordability can be drawn from the experience in Gambia and Senegal. In Gambia, there was a substantial decline in dipping after charges were introduced (from 80+ % to 16%, depending on the community). More recent data show that, in villages where insecticide was available, 45% of the women using bednets with one or more children under five had treated their nets. Availability was the problem: a move away from dipping days to open dipping increased the dipping rate. In Senegal, after charges were introduced for dipping (\$0.80 for cotton and \$0.40 for nylon nets), treatment fell by two-thirds. Moving from subsidy to cost-recovery eroded good will. The following year, an experiment was conducted in three villages. In

the first, people paid full price when they dipped, there the dipping rate was 40% In the second, people paid the full price, but payment was delayed, there the dipping rate was 75% In the third, the dipping price was subsidized so that people paid only \$0.10 per net, in this case the dipping rate was 80% (Source for Senegal data: Giancarlo, 1990)

Aside from subsidies, other options exist for reducing costs. Planners of ITM programs should explore alternatives for reducing costs through purchasing in bulk and warehousing and through improved manufacturing, packaging and distribution.

The challenge is to ensure that ITMs are widely used throughout sub-Saharan Africa, especially by those at greatest risk of developing malaria, and that the available resources for malaria control are used as wisely as possible.

2.3.4 Appropriate Use: Summary of the Presentation by Valerie Curtis (Centre Muraz, Burkina Faso)

The aim of this conference is to develop ITM strategies for the real world. The days of controlled trials of ITM efficacy are over—where most of the inhabitants of a village would use impregnated nets because they were given them without charge. The search now is for sustainable solutions. This means that target populations will have to make the effort to procure nets, curtains, dipping, and re-dipping for themselves. Whatever the type of program (health service based, NGO supported, commercial venture, etc.), people will have to go to a lot of trouble to get and maintain ITMs. Buying or getting nets and curtains, maintaining them, washing them, getting them dipped and re-dipped will require not only time and money, but also a lot of determination. If people cannot be offered something that they can use easily and effectively, that is available, affordable and attractive, the ITM program will fail. In other words, instead of trying to bend people's

behaviors to fit technologies, the technologies should be bent to fit people's behavior.

The consumer's point of view must be at the heart of ITM program planning. The main message is to give people what they want.

Health programs often mistakenly think that the health argument is the one that persuades people. This is not necessarily the case. Are ITMs used appropriately for malaria prevention, or can other uses also be "appropriate"? In Burkina Faso, where I work, we asked customers why they obtained a net. Most people mentioned a good night's sleep; no one mentioned malaria. People spent a lot of money on mosquito coils to prevent nuisance bites. This suggests that people want protection from mosquitoes.

When people were questioned about malaria, they identified five types they believed that each type had a different cause. Examples of causes were getting cold or soaked by rain, drinking bad local beer, eating greasy food, working under a hot sun, and being bitten by a mosquito. Serious malaria was caused by a spell from a sorcerer. A child may get a fever—a non-malarial fever—even if he or she sleeps under a net. The people might not know that it is non-malarial. These local understandings of malaria must be taken into consideration when designing programs.

Other socio-cultural factors include how late people stay up (are they under the nets when mosquitoes are biting?), whether or not they use the nets when it is too hot, places people sleep (do they sleep outside?), and so on. In Tanzania, when focus groups were asked why they couldn't sleep under nets in the fields, they explained that they wouldn't be able to get out from under the nets fast enough to head off the pigs from stealing the crops. A household survey in Burkina Faso revealed that only 20% had nets—most were full of holes, and they were too expensive to replace. However, 80% had curtains. Then there is the problem of lack of a bed. It appears crazy to buy a bednet unless one has a bed, in most instances. Yet in some countries, people use

nets with mats on the floor. Net washing also presents a problem. Women were asked not to wash their ITMs, but most women washed them anyway because they were dirty.

These examples are given to underline the point that ITM programs must start with use, not demand. It must be ascertained what potential customers want and know and like. Technology must be fitted to people. What people think and do is not the problem. The problem is that the so-called solutions don't take into consideration what people think and do. What people think and do should be viewed as an opportunity.

If ITMs are to "take off" and be adopted on a large scale by populations at risk

of malaria in the 21st century, the only way to succeed is to put people at the heart of our activities. This requires turning programs inside out. Instead of trying to solve our problem (reduce malaria prevalence) we have to find ways to solve the users' problems. Instead of using our medical logic, we have to find out about the logic of ordinary people's lives. Instead of trying to force a new idea on people, we have to understand how to offer them something that they are going to want so much that they will be prepared to go out and get it.

(The paper on which this presentation was based is included as Annex 6.)

III. Work Group Discussions: Relevance of Conference Themes to the Programming Process

3.1 Introduction

The heart of the conference was two rounds of work groups. In round one, conference participants were divided into four groups. These groups were further divided into groups of ten to twelve persons to discuss pertinent questions related to the four conference themes: demand, access, affordability, and appropriate use (see Box 1-1). These sub-groups consolidated their work and shared the results of their discussions. In round two, the conference moved from a thematic to a programmatic focus. Four new groups were formed to discuss the four steps in the program process and how the key thematic issues apply to those steps.

Annex 7 lists the questions given to all groups to guide their discussions.

This chapter presents the results of the two rounds of work groups. Table 1 at the end of the chapter summarizes the groups' discussion of how thematic issues are related to the ITM programming process.

3.2 Overview of Program Steps

Assessment Information is collected and analyzed to define the existing situation and clarify the needs, including a) biological feasibility (an entomologic profile and epidemiologic information), b) cultural feasibility to determine demand, c) institutional feasibility (the roles of the public and private sectors), and d) financial sustainability.

Planning Based on the information from the assessment, decisions are made on how the program will address the needs. The plan should include promotion, management, training, procurement, logistics, financing, and supervision and should clearly identify the partners and their roles and responsibilities.

Implementation Implementation addresses what needs to be done, when, where, and by whom. It includes start-up considerations, building program awareness and commitment, roles and responsibilities of key institutions, and carrying out program activities. Implementation should be geared to establishing a sustainable long-term program.

Monitoring and Evaluation Monitoring and evaluation assesses the program's effectiveness and results. It is an ongoing process and should include what kind of health and management information system is needed, how the information will be used for decision-making, and how to measure progress and impact.

3 3 Synthesis of Work Group Discussions

3 3 1 Assessment

Collecting reliable information on all aspects of a potential bednet program is absolutely essential.

Demand

Creating demand or building an ITM culture can be viewed from a long-term or short-term consideration of benefits. In the short-term, desire for ITMs may be based on reducing the nuisance from mosquitos, bedbugs, and lice, increasing privacy, and, in some instances, enhancing status. Long-term benefits, which may not even be considered by customers, are reduction in illness and death. Different socio-economic groups may be motivated by benefits. When planning a strategy for demand creation among various groups, all facets of demand must be considered.

Box 3-1 Information Needs for Assessing Demand

Individual Consumer/Community Level

- ◆ Nature of the malaria problem in the community
- ◆ Anti-mosquito measures currently in use (nets, coils, smudge pots, spray, repellants), their positive and negative aspects, including their costs
- ◆ Lifestyle information use/nonuse of beds, sleeping patterns, features of house construction, family decision-making
- ◆ People's understanding of malaria: severity, risk, seasonality
- ◆ Community access to communication channels
- ◆ Community demographics size, homogeneity, presence or absence of infrastructure, opinion leaders

National/Provincial Level (Those who would be responsible for administering an ITM program)

- ◆ Understanding of malaria.
- ◆ Knowledge of ITMs and perception of their benefits
- ◆ Level of commitment to malaria control as demonstrated by supportive policies, regulations, and budget allocations
- ◆ Perceived political capital to be gained from supporting an ITM program
- ◆ Organization of bureaucracy

Commercial Private Sector Level

- ◆ A master list of all potential players in this category, including manufacturers, distributors, sellers, and companies that have distribution channels that might be used for nets and insecticides
- ◆ Level of involvement in ITMs of each firm or organization identified.
- ◆ Ways that an ITM program might benefit them, both tangibly (profit, market share for manufacturers, distributors, and sellers) and intangibly (reputation, image)

Donor Level

- ◆ Ability to achieve potential benefits in short and long-term time frames

Demand for ITMs must also be created in groups and entities responsible for planning and implementing programs private businesses, local government officials, and donors, among others

To assess demand, information must be gathered at four levels, as shown in Box 3-1

Tools and techniques to accurately and efficiently measure demand are listed below. Before any of these tools are used, planners must reach clarity about what information they want to obtain. Information-gathering methods should be kept simple

- Professional market researchers
- Compilation of experience and data gleaned from professional literature, health center records, sales reports (of anti-malarial devices), etc

- Surveys
- Focus groups
- Anthropological investigations

Access

Many private companies in Africa conduct sophisticated market research surveys and campaigns. It should be possible for ITM programs to collaborate with them in obtaining information on ITM accessibility. Also, since most nets are purchased from the private sector, health professionals and manufacturers/suppliers of nets should communicate or share information on bednet and insecticide accessibility and use. However, private companies may not be willing to share what they consider proprietary information.

Box 3-2 Information Needs for Assessing Access

- Functioning distribution channels
 - ◆ railroads, roads, trucks
 - ◆ wholesalers, retailers
 - ◆ hawkers
- Distribution of customers
- Perceived standards of distribution
- Location—urban versus rural
- Access to ITMs within the family unit or household

These factors may not be equally relevant to nets and insecticides

Information should be collected on all the factors that influence household access to nets and insecticides, as shown in Box 3-2

Several market research tools have been used to assess the accessibility of bednets and insecticides

- Surveys
 - ◆ mail surveys of NGOs (for a relatively low cost)
 - ◆ school surveys to obtain information on coverage and use of nets in households
 - ◆ bus station surveys
 - ◆ exit interviews at pharmacies
- Observation techniques
- Focus groups
- Key informant interviews
- Community profiles/mapping

Groups to be targeted include the following

- Village medical centers
- Householders
- Shops
- Health workers

Affordability

There is no country in Africa where mosquito nets are not available. To assess the affordability of nets, information must be gathered on characteristics of buyers of nets: economic profile, reasons for buying, type of nets preferred, use of nets, place of purchase, income, geography, malaria vulnerability, etc.

Box 3-3 Information Needs for Assessing Affordability

Affordability and Health Goals

- ◆ Can families afford enough nets to assure that all persons at risk have a net?
- ◆ If only one net can be afforded, who will use it?

Subsidies

- ◆ Will ITMs be subsidized? Who will subsidize?
- ◆ Are there current subsidy patterns that exist in country?
- ◆ Are people used to paying for health products? (Are ITMs "health products"?)

General Affordability

- ◆ How low must the price be for general affordability?
- ◆ No matter how low the price is, it will still be unaffordable for some
- ◆ Research techniques are needed to investigate willingness to pay
- ◆ How will the need for repeated payments for re-impregnation and replacement of worn nets affect affordability?

Availability of Credit

- ◆ Will credit be available?
- ◆ Will payment schedules recognize seasonal variations in the availability of money (money is tight for some people during different seasons of the year)?

Effect on Purchase of Other Anti-Mosquito Devices

- ◆ To what extent will use of ITMs eliminate the need to purchase other anti-mosquito devices? (There is still a problem of mosquitoes biting before bedtime.)

Purchase Intent Priority

- ◆ What priority is given to purchase of ITMs versus other household priority expenditures?

Insecticides for the treatment of netting, on the other hand, are less likely to be readily available. Affordability of ITMs is a function of two basic parameters: how much nets and insecticides cost, and how much people want them, as shown in Box 3-3.

Appropriate Use

Before an ITM program is instituted, information should be gathered on the following topics. ITMs may not turn out to be an appropriate intervention for that particular locale.

Malaria status Actual incidence of malaria. (Could fevers and other malaria-like symptoms actually be caused by something other than malaria?)

Modes of transmission Behaviors of mosquitoes and other vectors, biting patterns.

Behavioral factors Health and sleeping practices, particularly of marginalized groups (seasonal workers, farmers, nomadic people, construction workers, peri-urban populations, other people who regularly or traditionally sleep outside an enclosed house, and in particular, those people who are not covered by "regular" health services).

Perceptions People's perception of the threat of malaria. Their understanding of the etiology of the disease.

Institutions Community and institutional structures, including the commercial sector, capable of handling a new program (this is particularly relevant for retreatment programs).

Malaria control programs A malaria control program in place with which an ITM program could be integrated. (Interaction between the public and private sector needs to be fostered.)

Operational conditions Health infrastructure already in place to establish and run an effective ITM program.

The topics above concern the appropriateness of ITMs as part of a malaria strategy. But appropriate or proper use of ITMs on the household level must also be considered (see Box 3-4).

The questions listed in Box 3-4 have not yet been answered on any national scale, except in Afghanistan, Gambia, and Vietnam, where comprehensive studies and surveys have been conducted.

The methods, tools, and techniques that are most needed to develop an ITM program must include both routine government statistics and other types of surveys, including qualitative information gained through focus group discussions,

Box 3-4 Information Needs for Assessing Appropriate Use

- ◆ Do people now using nets know how to use them properly to control mosquitoes and other vector-borne diseases?
- ◆ What do people use now to control mosquito bites?
- ◆ Who uses nets? Mothers? Children? Heads of households? Pregnant women?
- ◆ Where do people sleep?
- ◆ When do people use nets?
- ◆ Is there a difference in net usage between people in rural areas and urban areas?
- ◆ Does the population know how malaria is transmitted and how it can be controlled?
- ◆ If curtains or door covers are now used, are they used correctly?
- ◆ Are nets treated well? If they are washed, how often are they washed, and are they retreated after washing?
- ◆ Do people know how to properly re-treat nets?
- ◆ How many children under five years of age sleep under nets?
- ◆ Are nets used throughout the year or only during seasons of the year when mosquitoes are most prevalent and a nuisance?
- ◆ Is there a difference between the use of nets by urban and rural populations?

assessments of knowledge, attitudes, practices, and beliefs (KAPBs), and other consumer-based information-gathering techniques. It is not appropriate to focus solely on individual access; there is always a need for community-level data.

Before research tools and techniques are selected, the objectives of the assessment must be clearly articulated. Research conducted on appropriate use must be relevant and accurate, because research that is conducted poorly or improperly is worse than no research at all. Possible tools and techniques to determine current use of ITMs could include

- Observational visits and household surveys
- Focus group discussions to determine knowledge, attitudes, practices, and beliefs
- Interviews with users and nonusers
- Specific measures of quality control for use, washing, and retreatment of bednets and other ITMs

Learning by doing is also valuable in instituting new programs because we learn from our experience and we can correct mistakes before a program becomes too large and unmanageable. "Classical" research is not always valuable because it is often conducted in ideal conditions and cannot be used to draw conclusions about what results might be obtained in a real situation.

Box 3-5 lists some of the unresolved issues concerning the assessment phase of programming.

3.3.2 Planning

While our programming experience with ITMs is limited, our efforts with other health programs associated with child survival (e.g., oral rehydration salts), family planning (condoms and other contraceptives) and HIV/AIDS (condoms and behavior change) give us some insight into issues and approaches that may apply to the planning of ITM activities.

A long-term perspective should be maintained when planning an ITM program. Planners should be considering where people will be getting their nets and insecticides in the future, say in ten years. ITM programs should seek to

- Maximize utilization of ITMs
- Minimize dependence on subsidies and external financing
- Create a culture of using ITMs
- Make netting and insecticides widely available, affordable, and desirable
- Spur additional investments in improved technology, e.g., nets that don't need to be retreated or that need treatment less often and individual treatments

When planning an ITM program, a national committee would need to be set up to bring together and coordinate collaborators from the different sectors. Critical questions that need to be addressed are the respective roles and responsibilities of the public and commercial sectors, NGOs, and donors. Who has the budget response should be figured out in the planning stages. It might be the government or a donor. Planning questions that need to be addressed are who, what, when, where, why, and how. Coordination of information among participants is an important component that has been worked out in the past for polio and other projects.

The first step in planning is to set objectives. Proper planning depends on having

- An accurate definition of key issues, observations, and conclusions
- Realistic, achievable, and measurable objectives
- A clear understanding of the population to be targeted
- Clear roles of all involved in establishing, implementing, and monitoring ITM programs
- A partnership working style

Box 3-5 Outstanding Assessment Issues

Demand

- ◆ *Sustainability of demand.* Information needs for assessing demand tend to focus on initial demand, not on demand for retreatment or replacement of nets. To assess sustained demand, patterns of use over time (use/repeat use/ dropouts) have to be considered
- ◆ *The combined effects of pricing and availability.* What effect do different payment schemes have on demand? What is the relationship between demand creation and the existence of reliable distribution channels?

Affordability

- ◆ *Lack of experience.* Experience is lacking in assessing affordability, and the experience that exists has not been widely documented. It is an absolute necessity to conduct a situation analysis to determine plausible models for assessing affordability
- ◆ *Are ITMs health interventions?* Many questions revolving about affordability—especially the question of subsidies—are related to whether ITMs are considered health interventions or commercial products. Bednets can meet public health needs or purely private, domestic needs. Both public health and commercial aspects must be considered, however, dialogue with governments probably won't begin unless ITMs are considered health products (like vaccines)

Appropriate Use

- ◆ *"Appropriate" in what sense?* Health care providers, researchers, and donors may believe that appropriate use of ITMs is making sure that children under age five and pregnant and lactating women sleep under nets as protection from malaria. Focus group discussions have found, however, that people sleep under nets as a way to ward off nuisance bites from mosquitoes and get a good night's sleep
- ◆ *Appropriate for whom?* Products may not be appropriate across the board but may be appropriate for different circumstances: for different types of houses, for different family structures, and for different environments. One type of product for all of Africa is inappropriate
- ◆ *Need for effective case management.* Effective case management practices should be in place before ITM programs are instituted; that is, appropriate infrastructure and local capacity must be in place to monitor appropriate and effective use of ITMs before any such program is installed

Demand

Mechanisms typically most successful in promoting demand for bednets cover a wide gamut from radio/TV, street theater, point of sale products (pens, bags), meetings and educational events at churches and mosques, promotion by health facilities, newspapers, school programs (children are future customers), mobile video/films, testimonials by influential persons, and traditional channels (storytellers, singers). If appropriate public institutions use bednets—hospitals, for example, or military posts and boarding schools—that can be a stimulus for wider public demand. This could be the first step in a

demand-creation plan. If all hospitals and clinics were using bednets, it would be a huge social marketing message.

Mechanisms/approaches for promoting demand in other sectors (e.g., family planning, water, child survival), including the private sector, are highly relevant to creating demand for ITMs and should be considered when programs are planned. It is not necessary to reinvent the wheel. Appropriate technical support may be brought in to collect information and help design strategies. The process of planning for demand creation is the same for a range of projects. Considerations for planners are given in Box 3-6.

There is no universal recommendation as to what the message should focus on or who it should be directed at. In sum, what is needed is not a canned message but technical assistance and guidelines for formative research and development of a communication strategy

Accessibility

Few ITM projects have successful distribution systems. Some of the examples from which we can learn are UNICEF/Ministry of Health projects in Cambodia and Mali, PSI projects in Zimbabwe and the Central African Republic, and the Gambia national project, plus a few others.

Some factors which have made distribution and access successful are

- Buying in bulk which allows leveraging of resources
- Working within the existing infrastructure (health and non-health)
- Emphasizing local capacity building and supervision at the community level
- Absorption of distribution costs by donor agencies
- Importing duty free and zero VAT

Special mention should be made of the importance of retreatment of nets. This is an important, but usually neglected factor for project success. Box 3-7 gives some key considerations for planners. A distribution method in which products are sold through individuals or door-to-door, and not through stores, may have potential in Africa. Such interactions may offer an opportunity to educate people on the use and benefits of ITMs.

Box 3-6 Key Considerations in Planning for Demand Creation

Appropriate Mix of Approaches

- ◆ The basic options are mass media campaigns and a person-to-person approach. There is a role for both.
- ◆ The appropriate mix depends on the information gleaned from formative research.
- ◆ With a person-to-person approach it is easier to target geographic segments of the population.

Basic Messages

- ◆ Will the basic message be "a good night's sleep" or will it be "protection from malaria"?
- ◆ The two messages call for different strategies, however, it is probable that the mosquito nuisance factor is not sufficient as a motivator.

Groups to Target

Options for approaches and messages differ for key groups

- ◆ Consumers
messages: sleep well/stay healthy/protect children
approaches: education/media/marketing
- ◆ NGOs (local)
messages: community service
approaches: workshops
- ◆ Community leaders (sellers of corporate products on the local level)
messages: productivity/success/status
approaches: workshops/focus groups
- ◆ Private sector
messages: cost benefit/ profits/public relations
approaches: involvement
- ◆ Policymakers
messages: improved health/ practicality/ cost-benefit/public appreciation
approaches: forums, collaborative programs

Box 3-7 Key Considerations in Planning for Accessibility

Gender Issues

- ◆ Roles of men and women regarding ITMs will vary. It is important not to make general assumptions about gender roles but to assess gender roles in the project area (decision making, purchasing power, access to outlet, etc.)
- ◆ It is frequently observed that if a household has access to only one net, preferential use will be by the adult male(s), a generally low-risk population. Nets and information on their benefits should be made available to all family members.
- ◆ The role or potential of women in retreatment is an important topic to be considered in ITM projects.

Factors that Increase Access

- ◆ Promotion of curtains as well as nets
- ◆ Lowering the price of nets
- ◆ Awareness of community preferences regarding net sizes, materials, etc
- ◆ Ensure that men, if necessary, have a net

Sustainability

- ◆ Successful large-scale projects have usually had significant donor funding which may create an artificial environment. When donor funding ends, problems are encountered in resupplying nets and insecticides to community groups, and recurrent cost problems may arise. Projects have “succeeded” but have sustainability problems.

Affordability

The roles of government and the private sector must be clarified up front during the planning process. These roles, which have an impact on affordability, may change over time. Two dynamic processes are involved in planning the commercial development of the plan and the national strategy. The national strategy can look at various distribution strategies, including commercial ones. The objectives of the two processes should be parallel and not at cross purposes.

Affordability can be impacted at all levels of the production and distribution chain, from the manufacturer to the wholesaler to the retailer. Some things that could lower costs include

- Tariff reductions
- Subsidizing research and development (there are examples of this in the nutrition field and tropical drugs)

- Subsidies or cross subsidies (such as was done in the marketing and packaging of condoms)
- Bulk warehouses
- Economies of scale in manufacture
- Well-organized distribution systems
- Mechanisms to cut down on theft
- Credit schemes

Many factors must be considered in deciding whether or not local production will bring prices down. If nets are to be manufactured locally there must be available capital, raw materials, infrastructure, and expertise. Manufacturing locally has the advantage of providing local employment. A microenterprise (as in the case of the Benin Women's Coops) might be established and bulk materials could be assembled locally.

Price is determined by many factors including taxes and tariffs, which also add delays and red tape. If the intent is to protect local industry, then low or reduced duties on raw materials should be established. Local

Box 3-8 Key Considerations in Planning for Affordability

- ◆ What is the target group?
- ◆ Who should be involved in the planning process?
- ◆ Will the prices be set and, if so, how? Will a committee set prices?
- ◆ What will the cost structure look like and how may it change over time?
- ◆ What will be done if the nets are not affordable? What is Plan B?
- ◆ Will financing schemes be arranged at the household or community level?

value added tax (VAT) or surcharges must also be considered. If nets are considered a health product, what local VATs are there and would it make sense to lower them?

Another key issue is the advisability of subsidies. ITMs can be made more affordable through subsidies, however, they raise questions of sustainability. To some extent, most bednet programs are subsidized since the price of the net and the insecticides paid by the customer does not reflect the true cost of delivery of the product. The price does not include the costs of training, management, project planning, evaluation, and the like. If these "hidden costs" were included, the price of bednets would go up substantially. Because programs are likely to grow once they get established, it may be possible to plan for subsidies initially and to phase them out later.

The need for subsidies varies by socioeconomic group. Often people who most need the nets are the least able to afford them. The top socioeconomic group can afford to buy the nets at the market price. Middle and lower groups can afford to buy the nets at cost or some fraction of the cost. The number of people needing subsidies is closely linked to socioeconomic conditions in the project area.

In Eritrea, for example, the government was not able to distribute nets free of charge because of the expense. There had to be a cost-

recovery program. In Kenya, there is no standard pricing policy, and in general, nets are very expensive.

Credit schemes providing up-front financing for nets and insecticides should be made available, including extended payment schemes, wage deductions, borrowing from revolving funds, in-kind payments, incentives, vouchers, community schemes. For example, the community could pool its resources to buy the nets and hold a lottery to distribute them. Eventually the entire community would be covered. In sum, it is important to think creatively about ways to address the economic stresses families may be under.

Box 3-8 lists key questions to be answered in planning for affordability.

Appropriate Use

Lessons learned from other projects can be successfully adapted to promote appropriate use of insecticides and mosquito nets. Separate promotional programs need not be developed. For example, other social marketing programs (promotion of condom use) have been successful. Men can be convinced of the economic benefit of providing bednets for the whole family because they will spend less money later for malaria medicine, and the whole family will be healthy enough to contribute to farming and other income-generating activities. Information packets and promotional campaigns can be developed for ITMs, and community-level promotions can be developed to promote the use of ITMs. Ultimately, however, responsibility for promotion rests with the Ministry of Health and other national-level authorities.

Planning for appropriate use must begin with an understanding of users and what they want—hence the importance of formative research.

Box 3-9 lists long- and short-term approaches in planning for appropriate use.

Box 3-10 presents some unresolved planning issues.

3.3 3 Implementation

The goal of implementation is to establish a sustainable, long-term ITM program to reduce malaria and mortality and their consequences. Implementation must be realistic. Scaling-up to larger programs must be a gradual process. Mistakes will probably be

made. As with any new program, trial and error will yield useful information. To be effective, bednet and ITM programs must be integrated with other disease control programs. National authorities (particularly ministries of health) must assure that ITM programs are coordinated with other disease control efforts.

Box 3-9 Key Considerations in Planning for Appropriate Use

The most successful approaches for promoting the appropriate short-term use of bednets and insecticides should be based on what people want.

Short-Term Approaches

- ◆ ITMs should be distributed free of charge (at least initially)
- ◆ ITM products should be demonstrated to advertise and promote their use
- ◆ Distribution programs should be vertical, that is, they should not be a part of a study of vector control techniques
- ◆ Short-term use should stress the immediate relief from nuisance bites by offering a good night of sleep

Long-Term Approaches

- ◆ User fees could be instituted for cost recovery
- ◆ ITM programs could be integrated with other health programs and community-based health projects.
- ◆ Messages should be expanded from stressing immediate relief from mosquito bites to explaining how use of ITMs can help control malaria and how nets should be maintained, washed, and retreated

Box 3-10 Outstanding Planning Issues

- ◆ *Public/private role.* Both the public and private sectors have important roles, and the two must work in harmony for an ITM program to be implemented successfully
- ◆ *Sustainability of demand creation.* There is a difference between initially motivating and sustaining demand, or creating a culture of bednet use and reuse, the desire for nets is stronger than the desire for retreatment. There may be a need to market insecticides as well as nets
- ◆ *Demand and accessibility.* Ongoing access/availability to meet individual demand is an essential aspect of creating demand. If ITMs are not available, the resources poured into creating demand may be wasted
- ◆ *Timing.* Timing of a program is very important
- ◆ *Scale.* So far, ITM projects have been on a small scale. It would be a good idea to strive for a large-scale national, commercial, high-volume media campaign with adequate budget
- ◆ *Competition.* Does competition affect demand generation? Does it have the potential for bringing prices down?
- ◆ *Diversification of choice of products.* Could ITMs be more affordable if a range of products was presented, such as curtains or different standards of nets? What about retreatment options? Could nets be pretreated before distribution? This could be a faster process and possibly cheaper because nets could be treated in bulk.
- ◆ *Promoting new product development.* Some examples were fizzy tabs (which were developed for agriculture use), insecticide soaps, and frequent wash sachets

Demand

Roles and responsibilities of individual sectors in creating and sustaining demand vary during implementation

Private Sector Role

- Provides quality product good quality control, adequate packaging, clear instructions for use, etc
- Includes health promotion in advertising
- Collaborates with demand-creation activities
- Works in partnership with NGOs and district health management teams
- Continues operational research to evolve strategies for demand creation and appropriate and effective use

National Government Role

- Develops policies and legislation supportive of ITM programs (e g , import fees, tariffs, and VATs appropriate standards for use of insecticides, etc)
- Maintains a fully functional health system
- Facilitates education
- Facilitates supply
- Regulates standards of materials
- Deregulates markets, e g , define standards but allow for open movement of product
- Trains village health workers
- Provides guidelines for community health education

Key government and private-sector roles are summarized in Box 3-11

Donor coordination during implementation is an important issue. Setting up a national committee for ITMs can be a way to keep all groups involved from working at cross purposes. This is a role for the national government

Access

Many examples can be found of private sector distribution of insecticides through agrochemical or pharmaceutical networks. One problem with private sector distribution networks is that remote locations may not be reached or served. Another problem is the

Box 3-11 Key Government and Private-Sector Roles in Implementation

Government

- ◆ Exercises leadership in ITM programs
- ◆ Reduces taxes and import fees
- ◆ Assures access to ITMs for poorest communities
- ◆ Maintains standards

Private Sector

- ◆ Provides quality product
- ◆ Keeps product affordable
- ◆ Collaborates with demand creation
- ◆ Supports operational research
- ◆ Cooperates with government and NGOs in improving distribution

difficulty of controlling prices due to mark-ups at each level. This affects the ability to provide access to poor communities.

To improve distribution networks, public and private sectors should improve collaboration and work toward common goals.

The private sector has the responsibility to provide and promote re-treatment of nets.

Governments should assist the private sector by

- Facilitating the registration of insecticides
- Reducing taxes on nets and insecticides
- Working with private companies in promotion and training
- Assuming responsibility for ensuring access to poor communities

Smooth implementation of ITM programs depends on supportive government regulations. In other words, the fewer hoops manufacturers and distributors have to jump through to get nets and insecticide to the country, the faster the goods will reach the market.

Affordability

Private sector manufacturers of nets, insecticides and other inputs for ITM programs

can lower the cost and thereby increase the affordability of their products. Key factors in keeping costs low are to buy in volume, to standardize, and to plan. Although “one size fits all” doesn’t work, some standard guidelines can be followed, depending on the area covered. Also different shapes and sizes of nets could be offered. Basic planning helps in that the longer the lead time, the better. The lack of lead time increases the cost of distribution. Also the type of nets—shape, color, and style—impact cost.

How can manufacturers develop the market for ITMs? Some ideas include incentive schemes, promotional trials (such as sample trials), multi partners (i.e., public relations and research), credit schemes (whereby the first load would be paid for by the manufacturer), customizing or varying packages and sizes, and supporting research.

Assuming that there is broad scale implementation of net programs, the private sector will become larger scale, people will be able to afford more because there will be a stronger economy down the road, and there will be less need for donor support. But there will always be a role for government support to assure equity.

Both government and private sector policies must be flexible in the setting of prices for bednets and other ITMs.

Appropriate Use

ITM programs must continuously reinforce and adapt concepts of IEC (information, education, and communication).

An ITM program must be correctly introduced into a community in order to promote ownership and participation.

Training components must include different messages for different groups of people.

- People who handle insecticides and retreat nets must be trained in safety techniques and proper disposal of poisons.
- Supervisors and managers of ITM programs need comprehensive training in

malaria control, integrated health management concepts, monitoring, reporting, and program evaluation.

Above all, training must be participatory, be based on demonstrations, and must employ repeated and new information. Basic advertising techniques have shown that people respond well to simple messages with a gradual introduction of new and complex educational material.

Opportunities currently exist to integrate ITM training at a variety of levels: as a part of the training for district health workers, as part of basic child survival education for mothers, as a supplement to antenatal care programs, in school curricula, at traditional village events, and as part of microenterprise development projects (women’s groups, for example, may be convinced of the economic value of sewing and repairing nets).

3.3 4 Monitoring and Evaluation

Monitoring and evaluation consists of ongoing monitoring of program effectiveness and evaluation of program results. Before a monitoring and evaluation system is established, the following questions must be answered:

- What health and management information systems are needed?
- How will information be used for decision-making?
- How will progress and impact be measured?

Monitoring takes place on four levels—impact, outcome, process, and inputs.

- Impact: information on morbidity and mortality.
- Outcomes: information on demand, availability, affordability (price and equity), and appropriate use.
- Process: information on how results are to be achieved (program design).

■ Inputs information on resources required

Impact and outcome indicators can be defined in the abstract, but process and input indicators depend on the program design. Box 3-12 gives sample indicators by theme.

Monitoring can provide planners with information about the balance between public sector and commercial provision of nets. Periodic feedback on health, rates of malaria, household income, amount of re-soaking of nets, and so on will assist planners to make changes in program design.

ITM programs must be linked with larger government programs and incorporated into existing health information systems. Before ITM programs are introduced, there must be at least some basic infrastructure to measure control of malaria.

National and regional authorities ultimately have the major responsibility for public health, including malaria control. Costs of monitoring ITM programs should be built in at the planning stage, and program impact should be tracked through national health information systems. However, nomadic populations, internally-displaced persons, and migratory workers may be excluded from such statistical-gathering efforts. Donors and NGOs should assure that their programs are in accord with national policies.

In addition to the indicators listed in Box 3-12, the following information on community accessibility could be gathered:

- The number of people with technical knowledge of nets/insecticides within the community
- Access to gloves, adequate safety equipment (also includes environmental disposal methods for packaging)
- Outlets, nets, and insecticides per catchment area, per capita, and/or geographical population
- Information on "stock-outs" in outlets, or how often ITMs are not available for purchase

Box 3-12 Sample Indicators for ITM Programs

Demand

- ◆ sales and distribution data
- ◆ retreatment rate
- ◆ consumer satisfaction
- ◆ patterns of use over time (by season)

Accessibility

- ◆ proportion of target population for whom nets and retreatment are consistently available within a specified distance from home

Affordability

- ◆ proportion of target population that can afford to obtain a treated ITM and retreatment product

Appropriate Use

- ◆ entomologic susceptibility
- ◆ proportion of target population who slept under an effectively treated net
- ◆ frequency of washing
- ◆ impact (mortality and morbidity)

- Local groups/institutions involved in promotion/distribution (health centers, shops, churches, NGOs, etc.)

In collecting this information, seasonality factors must be taken into account.

Affordability

Percentage figures will give information about coverage, but it is also necessary to look at who's buying and who isn't. If people aren't buying nets and insecticide, an attempt should be made to find out why not. The number sold alone provides no information on whether or not the ITMs have reached the target groups.

It is important to monitor prices and to provide feedback to planners. Also the way costs are structured should be monitored. Costs of ITMs and overhead should be kept low. The costs of implementation should also

be monitored. If implementation costs are too high, the program may be unsustainable.

Subsidy schemes, scheduled phase outs of subsidies, and financing should be evaluated. What has been the effect of such schemes on the ITM market and on the unsubsidized ITM market? Too large a subsidy could destroy the market.

Appropriate Use

Some programs use the percentage of target groups sleeping under adequately treated nets as an indicator of appropriate use. Indicators should consider these types of topics:

- Under five mortality (Are there trends in levels of morbidity and mortality associated with the use of ITMs? How many children's lives are we saving?)
- Overall morbidity data
- Individual perceptions of the usefulness of ITM programs

It may be best to use a sentinel site as an indicator of ITM program effectiveness. To do this, however, may require that health information systems be strengthened, particularly at the national level.

Ultimately, an indicator of whether or how well an ITM program is working will be evident in overall community compliance (that is, if a community participates in statistics-gathering, and continues to pay for their nets

and insecticides, that, then, is the indicator of how well the ITM program is working).

The following indicators may also yield useful data on appropriate use:

- What is the frequency of insecticide retreatment?
- How many people live in a household? How many nets does the household have, and who sleeps under them?
- What is the proportion of people in the household who sleep under nets?
- What is the frequency of net washing?
- How many additional, unused nets does a household have (for visitors and other, unexpected needs)?

Obtaining data on these indicators is not easy. Focus group discussions and household observations are useful but are not always practicable. Involving the private sector in collecting data would yield significant data—for example, through the use of sales receipts—but manufacturers and retailers have no incentive to provide such data.

Costs for research to adapt and improve methods of collecting monitoring and evaluation data must somehow be fit into overall program budgets.

3.4 Summary of Key Points

The following table summarizes the key points of the work groups' discussions:

Table 1 Key Thematic Issues Related to the ITM Program Process

	Assessment	Planning	Implementation	Monitoring & Evaluation
Demand	<ul style="list-style-type: none"> ■ Solicit help of experts with assessment marketing firms for formative research ■ Find out <ul style="list-style-type: none"> ◆ current demand for and existing use of mosquito and malaria control ◆ characteristics of consumer/client/user ◆ demand at political and policy level, political commitment ◆ current perception of the importance of malaria ◆ present control measures needing improvement ■ Look at supply issues as they relate to demand 	<ul style="list-style-type: none"> ■ Coordinate contribution of stakeholders (roles and responsibilities, mechanism for communication) ■ Mix messages and channels of communication (use formative research to define mix) ■ Use well-established processes for development and execution of demand creation (lessons learned from other sectors) ■ Create overall strategy and plan 	<ul style="list-style-type: none"> ■ Use what has been learned about the customer/client/user ■ Be ready to make adjustments things change with time, a single approach won't last forever ■ View creation of an ITM culture as a long-term process ■ Convince policymakers that users come first ■ Don't create demand if supplies are not available (coordinate supply and demand) ■ Include policymakers in kick-off (include all players in start-up) 	<ul style="list-style-type: none"> ■ Monitor demand creation (sales, repeat usage, outlets, distribution surveys) ■ Make programmatic changes based on monitoring information ■ Set key indicators sales, utilization consumer satisfaction ■ Carry out KAP studies of users to compare with baseline KAP ■ Decide what mechanisms will be used for information gathering in the planning stage
Accessibility	<ul style="list-style-type: none"> ■ Look at existing delivery channels both public and private for opportunities to piggy back ■ Take an inventory of the policy constraints or opportunities related to the import, manufacture, distribution, and promotion of ITMs, i.e., government policies re taxes, duties registration ■ Look at the capacity of institutions at all levels to ensure availability of nets and insecticides ■ Look at availability at the country, regional, and community level (supply, manufacturer/ importer, current inventory) ■ Access consumer behavior in the marketplace re ITMs and similar consumer goods ■ Find out where nets come from, how they are being sold and distributed, and what distribution channels reach the target group 	<ul style="list-style-type: none"> ■ Take into account all aspects of planning (as given in guidelines) ■ Involve all appropriate stakeholders initially in coordination with the national malaria control program ■ Look at a large-scale program— even beyond national borders, provide guidelines for replication ■ Look at the programmatic framework and connections with other related programs and sectors ■ Develop an implementation plan 	<ul style="list-style-type: none"> ■ Provide a continuous source of technical support ■ Ensure adequate supply and re-supply of nets and insecticides ■ Prioritize projects based on epidemiology of malaria within a region or country ■ Use existing groups to distribute ITMs 	<ul style="list-style-type: none"> ■ Incorporate feedback mechanism on rates of malaria morbidity ■ Cover costs for the initial purchase of nets and retreatment ■ Evaluate financing and subsidy schemes ■ Assess how subsidies for targeted groups might affect the unsubsidized markets

	Assessment	Planning	Implementation	Monitoring & Evaluation
Affordability	<ul style="list-style-type: none"> ■ Find out <ul style="list-style-type: none"> ◆ volume and price of ITMs currently being sold ◆ who is or is not buying them (if nets are available) and why (income, geography, risk groups) ◆ current financing schemes ◆ economic profile of target population ◆ current subsidy patterns by target groups ■ Identify other household expenditure patterns and priorities ■ Gain an understanding of the policies and practices of the health system re distribution and availability of products 	<ul style="list-style-type: none"> ■ Find out <ul style="list-style-type: none"> ◆ whether ITMs are a national strategy or a local program ◆ what financing schemes (at household and community level) will be used ■ Examine implications of dealing with nets as health products or commercial products ■ Forecast the growth of the ITM market and estimate its implications for price and logistics ■ Decide who should set prices and how they should be set equity issue ■ If market sets price, consider subsidies ■ Set up a system of out-sourcing ■ Look at cost structure and how it will change over time ■ Articulate long-term vision for net/insecticide use ■ Decide who will pay for what and how long 	<ul style="list-style-type: none"> ■ Investigate credit schemes for poor populations ■ Examine lessons learned in cost-recovery from other ITM projects Entrea, Kenya, Tanzania ■ Promote public-sector role in assisting the poor and creating incentives for the private sector 	<ul style="list-style-type: none"> ■ Involve the consumer in monitoring and evaluation plans ■ Expand standard management information systems ■ Define indicators for effectiveness of ITMs at all levels
Appropriate Use	<ul style="list-style-type: none"> ■ Find out how nets are being used ■ Achieve an understanding of the parameters of transmission in the target area: behavior of people, behavior of vector, environmental conditions ■ Examine operational conditions policies and regulation, health and administrative infrastructure commitment, resources available/mobilizable 	<ul style="list-style-type: none"> ■ Decide on measurable, realistic goals ■ Identify target groups Who needs to use ITMs? ■ Establish clear roles and responsibilities/partnerships ■ Develop training for various groups 	<ul style="list-style-type: none"> ■ Ensure that retreatment services are provided ■ Design IEC programs to supplement technical support 	<ul style="list-style-type: none"> ■ Link methods for monitoring use of ITMs at the local level with those at the national level of health information systems ■ Examine how many bednets are used, what percent retreated, and ultimately whether or not use of bednets and ITMs affect mortality and morbidity

IV. Agenda for Action

The final plenary session of the conference began with report-outs from all four program-process groups: assessment, planning, implementation, and monitoring and evaluation. What we know—and what we don't know—about each stage of the process is given along with a list of actions. These report-outs are summarized in the boxes in Section 4.1.

The session concluded with an affirmation of USAID's commitment by USAID Administrator J. Brian Atwood, given here in its entirety in Section 4.2, and closing remarks by co-moderator Dennis Carroll, summarized in Section 4.3.

4.1 Presentations from Process Groups

Box 4-1 Agenda for Action: Assessment

<i>Knowns</i>	<i>We know that</i> <ul style="list-style-type: none"> ■ The primary focus of assessment should be on the customer ■ Generic and sector-specific tools exist for understanding <ul style="list-style-type: none"> ◆ users/customers ◆ the disease itself ◆ distribution channels ■ The private sector has a wealth of knowledge about marketing that the public sector lacks
<i>Unknowns</i>	<i>We don't know</i> <ul style="list-style-type: none"> ■ How to apply existing demand assessment tools to ITM programs ■ How to predict demand for ITMs
<i>Actions</i>	<ul style="list-style-type: none"> ■ Compile an inventory of useful tools and techniques ■ Synthesize/disseminate experiences for adapting existing tools and techniques for use in ITM programs ■ Adapt and apply existing tools in ITM programs ■ Conduct TIPs (trials of innovative products) to assess product demand ■ Use periodic post-market surveillance to assess product sustainability ■ Include the private sector as a partner in the design of ITM programs ■ Draw on the global marketing skills of the private sector

Box 4-2 Agenda for Action Planning

<p><i>Knowns</i></p>	<p><i>We know that</i></p> <ul style="list-style-type: none"> ■ Defining the final goal or objective of an ITM project is essential in designing the overall plan or strategy ■ Planners have various options from which to choose public, private, and mixed ■ It is critical to get buy-in from key stakeholders <ul style="list-style-type: none"> ◆ the national ITM strategy must be part of the national malaria control strategy ◆ the needs and point of view of the end-user must be taken into account ◆ for a national ITM strategy, the commitment of the national government is indispensable—without it the program will fail ■ Information collected at the assessment stage must guide the planning stage ■ The plan must be implementable, i.e., it <ul style="list-style-type: none"> ◆ includes a limited number of realistic objectives ◆ clearly states all assumptions on which it is based ◆ is flexible enough to adapt to changing circumstances ◆ incorporates a budget ◆ identifies indicators for monitoring performance
<p><i>Unknowns</i></p>	<p><i>We don't know</i></p> <ul style="list-style-type: none"> ■ The extent to which the consumer will buy into the ITM approach (How many nets will they buy?) ■ What level of commitment exists among <ul style="list-style-type: none"> ◆ governments (can they promote “commercial” activities?) ◆ donors ◆ the commercial sector (they don't see a big market) ■ How to prevent subsidies from undermining the commercial market ■ Technical unknowns <ul style="list-style-type: none"> ◆ pyrethroid resistance the immediacy of the threat ◆ existence of suitable non-pyrethroid alternatives ◆ impact of a malaria vaccine on ITMs
<p><i>Actions</i></p>	<ul style="list-style-type: none"> ■ Foster debate on the issue of private/public sector mix ■ Test mixed approaches and models (larger scale) to see if sustainability and equity can be combined ■ Establish mechanisms to exchange lessons learned from past experience ■ Produce a guide for ITM planners ■ Test non-pyrethroid alternatives ■ Promote (“sell”) ITM plans and programs

Box 4-3 Agenda for Action Implementation

<i>Knowns</i>	<p><i>We know that</i></p> <ul style="list-style-type: none"> ■ Short-term projects have been carried out, but there is no experience with long-term projects ■ Enthusiasm exists for starting ITM programs among multiple players, this needs to be channeled through leadership, coordination, collaboration, and action. The supply of nets must be increased ■ Technical problems are still to be solved concerning retreatment, timely supply of nets and insecticides, cost recovery, and recycling funds ■ An initial capital investment—from public and private sources—is needed ■ Implementation should be phased to anticipate a program's growth stages—start implementation on a zonal basis, then expand ■ Ripple effects to neighboring communities for rapid coverage with minimal inputs can be achieved through prioritizing geographical program starting points ■ A continuous source of technical support must be available within easy reach: communications, accounting, administration, education, etc ■ Existing community structures can be used to identify those who may need assistance to acquire ITMs (e.g., women and children) ■ Promotion is one of the most significant aspects of an ITM program ■ Generally, subsidies are not a good idea, but the poorest of the poor may need help
<i>Unknowns</i>	<p><i>We don't know</i></p> <ul style="list-style-type: none"> ■ How to create public/private sector partnerships at the local level (The public sector should not be marginalized, they have a role which is mainly to establish mechanisms and regulations to smooth the way for the private sector) ■ What mechanisms and roles are necessary for control and regulation by the government ■ What the long-term effects of ITMs are on malaria immunity ■ Easy methods for retreatment of nets (Good experience exists with community-based retreatment but none with home-based retreatment) ■ The amount of ITM coverage required to have an effect on malaria ■ A simple, accurate technique for detecting the level of active insecticide on netting material ■ The applicability of insecticide-treated curtains and other ITMs under varied geographic and cultural settings
<i>Actions</i>	<ul style="list-style-type: none"> ■ Increase sources of supply and distribution channels for ITMs and options for retreatment services ■ Build the capacity to implement ITM programs at the country level, both in human resources and funds ■ Start large-scale programs within the existing health infrastructure

Box 4-4 Agenda for Action Monitoring and Evaluation

<i>Knowns</i>	<p><i>We know that</i></p> <ul style="list-style-type: none"> ■ It is difficult to define indicators without defining models ■ There are limitations as to how much additional information can be added to current health information systems ■ Ongoing data collection is not necessary for all indicators ■ A heavy investment in monitoring and evaluation of ITM programs is justifiable at this initial stage ■ Mortality and morbidity data are often unreliable ■ It is difficult to attribute changes in morbidity and mortality to specific programs ■ Private companies are unwilling to share their data ■ Self-evaluations are usually biased
<i>Unknowns</i>	<p><i>We don't know</i></p> <ul style="list-style-type: none"> ■ How to apply existing monitoring capabilities to ITM programs
<i>Actions</i>	<ul style="list-style-type: none"> ■ Generate a menu of standardized indicators for specific models, including <ul style="list-style-type: none"> ◆ source of data ◆ collection methodologies ◆ frequency of collection ◆ cost of collection ◆ responsible parties ■ Develop guidelines for community-based monitoring ■ Conduct field tests to evaluate insecticide resistance ■ Test methods of evaluating residue on bednets

4.2 USAID's Commitment: Presentation by J. Brian Atwood, USAID Administrator

I would like to thank you all for your participation in this conference, which I know has been productive. Combatting malaria is clearly more than just a vital public health issue, it is a dilemma whose resolution is fundamental to development as a whole.

We have seen growing recognition of the tremendous problem posed by malaria this year. The *Atlantic* ran a cover story on the resurgence of the disease. The *New York Times* published a long feature on malaria and noted that the cumulative statistics concerning malaria "have so many zeros that it is impossible to conceive of the heartbreak they represent." Senators Leahy and McConnell—Senator McConnell, who himself suffered polio as a youth—have helped lead the

Congressional charge that we need to do more to fight infectious disease in the developing world. Jeffery Sachs, in a thoughtful piece in the *Economist*, detailed the devastating economic effects of tropical diseases and their costs to developing nations.

Many of these commentators have been bluntly critical of the international community's response to malaria. The *Times* commented, "The extraordinary thing about the mosquito is that in the current battle against the best minds of 20th-century science and medicine, the mosquito may be winning." There are bountiful statistics to buttress this criticism, with which most of you are familiar. Malaria causes more than 2 million deaths a year, principally among children and infants. Ninety percent of these deaths occur in sub-Saharan Africa. Between 300 and 500 million people now get malaria each year. Someone dies from malaria about every fifteen seconds. During the last decade, malaria has killed

about ten times as many children as all the wars in that period combined

The direct economic cost of malaria in Africa—including lost wages, the cost of treatment, and the expense of traveling to a clinic or a hospital—was estimated to have been \$1.7 billion in 1995. That already astronomical figure is expected to double over the next five years to \$3.5 billion. At the household level, approximately 20% of disposable income of low-income African households is spent on mostly ineffective malaria treatment. And, in many African countries out-patient treatment for malaria accounts for up to 40% of all public health expenditures. Even as malaria already extracts a heavy toll on Africa, over the coming years it is estimated the region can expect a 7-20% annual increase in malaria-related deaths and cases of severe illness.

Despite these grim statistics, the international community has had difficulty marshalling resources to combat malaria. While figures vary, it is clear that spending on malaria control and research remains very low, especially when you look at the number of fatalities caused by the disease. In short, to all those who would criticize the international response to malaria I would say this *you're right*. We aren't doing enough, and that has to change. We have to do a better job combatting not only malaria, but a range of other infectious diseases, or we will risk seeing important economic gains in the developing world undone by a growing public health crisis.

The growing visibility of the malaria problem is an important part of the response. We need to educate the public and the Congress about the severity of this problem. As an agency, USAID is operating in a time of very tight resources. This situation is replicated at the United Nations and among most donors. Not only in the public health field, but across all of our activities, the international community is too often forced to rob Peter to pay Paul.

Do we cut funding in agriculture to fight AIDS? Do we abandon environmental programs to fund family planning? Do we fund basic education or microenterprise? The choices are extraordinarily difficult and it is incumbent upon all of us to help educate the public that combatting infectious diseases is a *public investment* that we cannot afford not to make. We must also do a better job leveraging resources from the private sector to help fight malaria if our efforts are to be successful.

USAID—as the lead U.S. government agency in the fight against malaria and other infectious diseases in the developing world—is working at a number of levels to address the root causes of these public health issues. USAID's approach to infectious diseases consists of four interrelated elements. First, we are working to change the social and economic conditions—such as poverty, lack of sanitation, rapid population growth and environmental degradation—that allow infectious diseases to flourish. Second, we are working to improve health systems so developing countries themselves can better control infectious diseases. Third, we are carrying out specific targeted programs to address priority diseases. Lastly, we are continuing to enhance our capability to respond to emergency disease situations.

USAID's health programs focus on the major killers of children under the age of five—pneumonia, diarrhea, measles, malaria—and HIV/AIDS. In 1996, USAID devoted an estimated \$320 million to the prevention, surveillance, and treatment of these diseases and the development of simple and affordable technologies to ameliorate their effects.

USAID's malaria control efforts in recent years have focused on the development of new approaches and technologies for its prevention and control. The emergence and spread of strains of malaria that are increasingly resistant to available treatments pose real problems. As an agency, we are continuing our support for the development of

a malaria vaccine In Africa we are field testing options for practical and sustainable control of the disease, as well as working with the World Health Organization to strengthen the capacity of national malaria programs

The lessons learned from these programs have significantly increased our understanding of the impact of malaria and options for its prevention and control As a result, we, along with many of you, have reassessed the options for malaria control and added new interventions, and strategies for a more targeted application of existing control measures have emerged

USAID's approach is a package of maternal and child health interventions for malaria control that emphasizes improved management of the disease and its prevention One of the major constraints we face in trying to reduce the burden of malaria, especially in its association with the emerging drug resistant strains of malaria, is the lack of simple and effective tools for the prevention of malaria infection

The success of the recent "bednet" trials in East and West Africa has been dramatic, as you have discussed during the last couple days The use of treated bednets, first used by soldiers during the Second World War fighting in the tropics, could give us an upper hand in fighting malaria The bednet trials showed that insecticide treated nets can significantly reduce deaths from a number of causes, not just malaria, and that we can significantly reduce malaria related mortality even in areas that have been traditionally hardest hit by the disease

But we all appreciate that a few successful field tests do not necessarily mean that bednets can widely be transformed into an effective program against malaria In many areas, bednets are too expensive for families struggling with profound poverty, and issues relating to market access and retreatment of the nets with insecticide will also have to be addressed

Again, I cannot over emphasize that to successfully meet the challenge of malaria will

require a concerted and well coordinated effort of not simply the donor community working with national programs, but will also need to involve a partnership with the private sector who manufacture critically needed nets and insecticides

I can assure you that USAID will be a steady partner in these efforts USAID's commitment to expanded efforts in malaria are linked to our agency infectious disease initiative, led by the Congressional support of Senators Leahy and McConnell, which is currently working its way toward passage In 1998 we plan on supporting an expanded application of recently proven interventions for the prevention and control of malaria, including expanded field trials in Africa, within the context of our existing maternal and child health programs We will also be undertaking an initiative in Africa to promote insecticide-treated mosquito nets

We look forward to the opportunity of working with you to explore how best to apply the findings and recommendations you have made during this conference This meeting has provided a unique opportunity to bring together new combinations of ideas and experiences, which we hope will lead to innovative approaches to addressing the problem of malaria And we all look forward to a time when people will reflect back upon these days as the time when we turned the corner in our fight against malaria

4.3 Meaning of the Conference and Next Steps: Summary of the Presentation by Dennis Carroll

In closing this conference, I would like to acknowledge that 1997 celebrates the twentieth anniversary of smallpox eradication We should not forget the lessons that may be drawn from this stellar accomplishment Smallpox eradication was no small feat. In 1966, when the program started, smallpox accounted for a major proportion of childhood deaths Eleven years later the disease was wiped out, and 5 million lives per year were

saved I am not suggesting that we can wipe out malaria the way we wiped out smallpox, but we should take solace in the fact that what seemed an insurmountable problem was overcome

The campaign for smallpox eradication was predicated on a shared vision, as we also have begun here to fashion a shared vision of what we want to achieve and how we intend to measure our success As Christian Lengeler told us, we have the potential of saving 400,000 child lives per year As Trevor Penhallrick made us remember, we shouldn't look at Africa as a lost cause it ain't broke, don't fix it He gave us the vision of a new paradigm for doing business in Africa—one that offers us a wealth of opportunities Valerie Curtis's insights from her experience in Burkina Faso centered around the vision of giving people what they want What ITM programs deliver

should be what people want and need The whole conference has given us a vision of the strength inherent in a public-private partnership

This conference underscores that together we will find answers to the big issues of demand, access, affordability, and appropriate use It is the beginning of a dialogue on opportunities to work together

We hope to reconvene in the next 18 months somewhere in Africa to track our progress and further cement our partnership This and subsequent periodic meetings will keep us in touch and keep us motivated

A vision is organic it changes like a living creature If we stay true to our vision and the partnerships we have formed, we can accomplish the unimaginable Two million lives per year lost to malaria is unacceptable at the end of the twentieth century

A Selected Bibliography on Bednets & Other Insecticide-Treated Materials 1991 - September 25, 1997

(Copies of this bibliography with annotations can be requested by sending an email to Dan Campbell at USAID's Environmental Health Project His email is campbelldb@cdm.com)

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Total attendees 163

Annex 2

Conference Program

INTERNATIONAL CONFERENCE ON BEDNETS & OTHER INSECTICIDE-TREATED MATERIALS

Washington, DC
October 29-31, 1997
AGENDA

Co-Sponsors

AgrEvo
American Cyanamid
Bayer AG
Malaria Consortium
Rotary Clubs Against Malaria
Siam Dutch
UNICEF
USAID
WHO
Zeneca

Day 1 – Morning Session (Plenary)

- | | | |
|-------|---|---|
| 8 00 | Registration | |
| 9 00 | Welcome and Keynote | |
| 9 15 | Background and Purpose | Moderator |
| | <ul style="list-style-type: none">• Review of Bednet Field Trials• Overview of Bednet Experience in Africa | Christian Lengeler
(<i>Swiss Trop Inst</i>)
Deogratias Barakamfitiye
(<i>WHO/AFRO</i>) |
| 10 00 | Plenary Presentations - Introduction | Moderator |
| | <ul style="list-style-type: none">• Demand• Access | John Berman (<i>PSI/Kenya</i>)
Marcia Griffiths (<i>Manoff</i>)
Trevor Penhallrick
(<i>Group Africa</i>) |
| 10 40 | Break | |
| 11.00 | Plenary Presentations continued | |
| | <ul style="list-style-type: none">• Affordability• Appropriate Use | Jane Rowley
(<i>MRC/The Gambia</i>)
Valerie Curtis (<i>LSHTM</i>) |
| 12 00 | Discussion of Morning Sessions | Moderator |
| 12 25 | Introduction of Working Groups ¹ | Moderator |
| 12 30 | Lunch (at the Renaissance Washington, DC Hotel) | |

¹ On the first day of the Conference participants will be organized into working groups that focus on issues related to the four plenary themes—access, affordability, demand and appropriate use. On the second day the working groups will be re-organized to examine how these issues need to be addressed during the programming process: assessment, planning, implementation, and monitoring.

AGENDA (cont'd)

Day 1 – Afternoon Session (Working Groups)

- 1 30** Plenary Theme Work Groups Convene
- Demand
 - Access
 - Affordability
 - Appropriate Use
- 3.30** Break
- 3 45** Continue to discuss questions in work groups
- 5 30** Plenary Theme Work Groups conclude
- 6 30** **POSTER SESSION**
[Grand Ballroom - Central]

Day 2 – Morning Session (Work Groups)

- 8 30** Reconvene Plenary Theme Work Groups —
Case Studies
- Demand
 - Access
 - Affordability
 - Appropriate Use
- 9 15** Plenary Theme Work Group discussions continue
- 10 15** Break
- 10 30** Work Groups continue
- 11 45** Plenary Theme Work Group Synthesis — what are the
key points to be shared with afternoon programming
guide work groups
- 12 15** Prepare for afternoon sessions
- 12 30** Lunch

AGENDA (cont'd)

Day 2 – Afternoon Session (Work Groups)

- 1 30** Programming Guide Group Sessions — organized according to elements of programmatic process
- Assessment
 - Planning
 - Implementation
 - Monitoring
- Report-out from each of the Plenary Theme Work Groups
- 5 30** Programming Guide Work Groups wrap up
- 6 30** **RECEPTION ON CAPITOL HILL** — Hosted by Sen Patrick J Leahy

Day 3 – Morning Session (Plenary)

- 8 30** Programming Guide Work Group presentations of conclusions, Moderator recommendations, and proposed action agenda
- Assessment Chairperson
 - Planning Chairperson
 - Implementation Chairperson
 - Monitoring Chairperson
- 10 00** Discussion Moderator
- 10 30** Break
- 11 00** Conference Synthesis and vision for the future Moderator
- 11 30** Closing Brian Atwood
(USAID Administrator)
- 12 00** End

Annex 3

Letter of Invitation and Registration Packet

INTERNATIONAL CONFERENCE ON BEDNETS & OTHER INSECTICIDE-TREATED MATERIALS

Co-Sponsors

AgrEvo
American Cyanamid
Bayer AG
Malaria Consortium
Rotary Clubs Against Malaria
Siam Dutch
UNICEF
USAID
WHO
Zeneca

September 29, 1997

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S A M P L E

Dear Dr Premji

On behalf of the Co-Sponsoring Organizations, we would like to invite you to an *International Conference on Bednets and Other Insecticide-Treated Materials*. The conference, which will be hosted by the United States Agency for International Development (USAID) and held in Washington, DC, begins Wednesday, October 29, and ends Friday, October 31. Registration forms and information on the venue of the conference and hotel accommodations are enclosed.

The conference will bring together public health practitioners, private sector representatives, and international donors to share their insights and research findings about the promotion and use of insecticide-treated nets, with particular focus on their application in Africa. This conference will not only provide a forum for the exchange of ideas and information but is expected to produce three very important products. The first is a guide for bednet programmers describing the most effective approaches for promoting bednets and other insecticide-treated materials, the second is an agreement between the private and public sectors to work together in partnership to make affordable netting and insecticides available, and the third is standards for monitoring and evaluating bednet programs.

The conference will begin with a review of the bednet efficacy trials in Africa and the current status of bednets in the region. This will be followed by a presentation of our understanding of

- Demand creation through social marketing of nets and insecticides
- Behavioral and other factors that favor and impede the use of nets and insecticides
- Affordability of nets and insecticides
- Logistics and distribution options for maximizing access to nets and insecticides

Using the information provided in the plenary as a base, participants will join one of the following work groups to discuss key topics in depth and reach some consensus on approaches and issues.

INTERNATIONAL
CONFERENCE
ON BEDNETS
& OTHER
INSECTICIDE-
TREATED
MATERIALS

- *Public Demand* At present public demand for insecticides, bednets, and other insecticide-treated materials is marginal in the region. What little demand exists is for mosquito netting. There is no history of personal use of insecticides for treatment of bednets.
- *Access* Bednets are generally available only in urban areas—if at all—and no organized public or private systems exist for delivery of insecticide services for treatment of nets.
- *Affordability* In many places, bednets currently cost \$10 to \$25, and insecticide treatments \$1 to \$2 per year. The typical household is likely to need three or four bednets. This means that the use of insecticide-treated bednets could be unaffordable for most households.
- *Appropriate Use* Bednet programs cannot be successful unless a number of ingrained behavioral and social patterns change. Without such changes, it is unlikely that the right populations (children under five and pregnant women) will use the nets and use them correctly.

To obtain as much benefit as possible from a conference of this type, which will be attended by people with valuable experience in bednet programs and related fields, we will hold a poster session the first evening. All participants who wish to do so will have the opportunity to make a brief presentation. If you are interested, please fill out the Poster Session Abstract in the registration packet.

We hope that you will be able to attend this conference and look forward to working with you. Please fill out and send in the registration form no later than September 15. This packet contains the registration form and a return envelope to be sent to the Environmental Health Project, the conference coordinator. If you have questions about the conference that this invitation doesn't answer, please do not hesitate to contact one of us.

Sincerely yours,

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Attachments

Conference Announcement
Conference Registration Form
Information about Conference Venue and Accommodations
Room Reservation Guarantee Form
Poster Session Abstract
Working Group Sign-up

INTERNATIONAL CONFERENCE ON BEDNETS & OTHER INSECTICIDE-TREATED MATERIALS

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UPCOMING INTERNATIONAL CONFERENCE

Bednets and Other Insecticide-Treated Materials

The United States Agency for International Development (USAID) and co-sponsoring organizations are organizing a two-and-a-half-day conference on bednets and other insecticide-treated materials, with a special focus on their application in Africa

Where? *Washington, D C*

When? *October 29-31*

Who Will Attend?

- ◆ *Malaria control program managers and other public health practitioners from Africa, Asia, Europe, and the United States*
- ◆ *Private-sector manufacturers of netting materials and insecticides*
- ◆ *Representatives from nongovernmental organizations (NGOs) and international donors*

Expected Outcomes:

- ◆ *A guide for bednet programmers describing the most effective approaches for promoting bednets and other insecticide-treated materials*
- ◆ *An agreement between the private and public sectors to work in partnership to make affordable netting and insecticides available*
- ◆ *Standards for monitoring and evaluating bednet programs*

FOR MORE INFORMATION ON THE CONFERENCE CONTACT

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UPCOMING CONFERENCE

Bednets and Other Insecticide-Treated Materials

The Unanswered Questions About Bednets

The lack of suitable options for prevention is a major constraint facing national and international programs to reduce the burden of malaria, especially among children and pregnant women. Trials of insecticide-treated bednets conducted recently in East and West Africa have demonstrated that this simple technology can reduce deaths among young children, not just from malaria, but from all causes. These were mainly controlled trials in which bednets and insecticides were distributed for free. How effective bednets and other insecticide-treated materials, such as curtains, would be under conditions of *voluntary acquisition and use* is less clear.

Challenges of Promoting Sustainable Bednet Utilization in Africa

Experience has shown that, to be successful, bednet programs must create conditions for sustained *public demand for, access to, and appropriate use of affordable* nets and insecticides to treat them.

Public Demand At present, public demand for bednets and other insecticide-treated materials is marginal in the region. What little demand exists is for mosquito netting. There is no history of personal use of insecticides for treatment of bednets.

Access Bednets are generally available only in urban areas—if they are available at all—and no organized public or private systems exist for delivery of insecticide services.

Affordability In many places, bednets currently cost \$10 to \$25 and insecticide treatments \$1 to \$2 per year. The typical household would need three to four bednets. This means that the use of insecticide-treated bednets could be unaffordable for most households.

Appropriate Use Bednet programs cannot be successful unless a number of ingrained behavioral and social patterns change. Without such changes, it is unlikely that the right populations (children under the age of five years and pregnant women) will use the nets and use them correctly.

Purpose of the Conference

During the conference, public health practitioners and representatives of private organizations and international donors will work together to bridge the gap between the potential of bednets and other insecticide-treated materials and the reality of current social, economic, and behavioral forces. Participants will share their insights about the promotion of insecticide-treated bednets in diverse settings in Africa and explore how to develop operational models for implementing this promising new technology for the prevention of malaria.

POSTER SESSION

A poster session will take place for 90 minutes at the end of the first day of the conference to provide an opportunity for participants to share experiences related to bednets and insecticide-treated materials. For those of you who are unfamiliar with the term "poster session," here is how it works. In a large room, those who choose to can display on an easel a poster describing the findings from a project or activity. Each person with a poster stands beside it and answers questions, as the participants circulate and move from one poster to another. This format provides an excellent opportunity to network and find out what others are doing in a relatively short amount of time.

The subject of the poster can vary. It could be a research activity, an implementation activity, or a publication. The activity can be ongoing or completed. The poster should not have too much detailed information, and the written material should be large enough to read as people walk by. Pictures and other graphics are very appropriate to include. Only one poster per activity is permitted. Although there are no firm guidelines about what the poster should look like, we do have some suggestions for basic information to include:

- ◆ Title
- ◆ Organization(s) involved in the activity or author(s)
- ◆ Purpose of the activity
- ◆ Brief description
- ◆ Findings
- ◆ Lessons learned

If you are interested in preparing a poster for this session, please fill out the attached form and return it to the Environmental Health Project by September 15, 1997. There is no limit on the number of posters that can be displayed.

Annex 4

Poster Session Abstracts

POSTER SESSION ABSTRACTS

- 1 Efficacy against *Aedes aegypti* of Olyset Bednets after Washing (Olyset net is a polyethylene net made with thread containing permethrin)
- 2 Experiences and Implementation Strategies for Cyfluthrin-Impregnated Bednets
- 3 Social Marketing of Insecticide-Treated Nets
- 4 Implementing Insecticide Treated Mosquito Net Schemes A Toolbox Manual for Managers
- 5 K-O TAB A New Formulation for Impregnation of Mosquito Bednets
- 6 The Effectiveness, Cost, and Risk of Selecting Resistance with Different Pyrethroid Treatments
- 7 Pyrethroid Resistance in *Anopheles gambiae* s s and Efficacy of Impregnated Bednets First Results of a Field Trial in West Africa
- 8 That you have to reach the mass market is a certainty! How best to do so is no longer uncertain
- 9 Socioeconomic Ractors of Treated Bednets Implemmented through the Primary Health Care System in a Semi-Rural Area of Southern Mozambique
- 10 New Technology for Treating Bednets
- 11 Mosquito Nets by Mail Order
- 12 Net Gain @PATH Canada
- 13 FENDONA Impregnated Bednets, Protection & Prevention
- 14 Economic and Social Aspects of Insecticide-Treated Bednets Used as a Malaria Control Measure in Rural Gambia
- 15 A Modified Kerosene Lamp for Domestic Protection against Mosquitoes
- 16 Issues in Sustaining a Community-Based Mosquito Net Intervention in Bagamoyo District, Tanzania
- 17 Pyrethroid Impregnated Bednets for Personal Protection and Control of Malaria in Afghanistan
- 18 Evaluation of the Ongoing Insecticide Impregnated Bednet Activities within Bamako Initiative Programme

Experiences and Implementation Strategies for Cyfluthrin-Impregnated Bednets

Organization. BAYER AG

Purpose of Activity

To test different locally adapted implementation strategies for impregnated bednets

Description of Activity

- 1 India Field trial in cooperation with a large employer and its health system
- 2 Zimbabwe Joint program with a ministry, a mission hospital, and the private sector
- 3 China Government scheme plus development of an over-the-counter scheme

Findings

- 1 Employers will support a bednet program if the results of the new strategy reduce health-related costs and can be easily maintained
- 2 NGOs with the blessing of the Health Ministry can play a crucial role as opinion leaders in this area
- 3 If the intervention is acceptable, individuals will spend their own money for health-related items not covered by the government (especially if the problem has high nuisance value)

Lessons Learned

No single implementation strategy can be designed for all countries Local adaptations have to be made Partners can come from various levels, but in all cases, the private sector can be a driving force

Efficacy against *Aedes aegypti* of Olyset Bednet after Washing (Olyset net is a polyethylene net made with thread containing permethrin.)

Organization/author Takaaki Itoh (Sumitomo Chemical Co , Ltd , Japan)

Purpose of Activity

To study the process of restoring effectiveness of an Olyset net after laundering or washing

Description of Activity

When an Olyset bednet collects dust after long use and is washed, the active ingredient on the surface of the thread may be removed along with the dust. Even though the active ingredient is reserved inside the thread, its migration speed from the inside area to the surface is quite slow at room temperature. Thus, acceleration of the migration speed was studied.

Findings

When a washed net with acetone was stored at 60°C for five hours or 70°C for one hour, it had the same knock-down and lethal effect as an unwashed net.

Lessons Learned

When, after long use, an Olyset bednet is laundered, storing it in a transparent bag in strong sunlight restores the net's efficacy against mosquitoes. The sunshine raises the temperature inside the bag, drawing the active ingredient from the thread's core to its surface.

Social Marketing of Insecticide-Treated Nets

Organization Population Services International

Purpose of Activity

To illustrate the role of social marketing for insecticide-treated nets and the retreatment product.

Description of Activity

We will discuss the elements of one project in the context of the various countries in which PSI has worked. The elements include price, promotion, product, place, and distribution. In addition, the role of monitoring and evaluation will be discussed as they support and influence the other elements.

Findings

(A few are listed here. We will discuss others also.)

- 1 Rural people have money to buy nets. The subsidized nets were "leaking" from the project area and being sold for higher prices.
- 2 Retreatment lends itself to being subsidized.
- 3 Retreatment promoters were trained, and an initial liter of retreatment product was sold to them on credit. The cost was never paid back.
- 4 Demand for retreatment requires vigorous promotion and significant education.

Lessons Learned

- 1 We should examine the possibility of cost recovery for nets and look into ways to create a revolving fund to repurchase them.
- 2 Retreatment can be subsidized because of its low cost and the fact that there is not much opportunity to resell (the insecticide solution) for profit.
- 3 The viability of a retreatment program depends on the investment and motivation of the retreatment promoter. Perhaps promoters/agents should invest in the program with their own money by purchasing the first liter of insecticide.
- 4 The main aim of promotion should be to increase the priority given to buying a net compared to other household expenses and to provide information on schemes set up to make nets more affordable.

Implementing Insecticide-Treated Mosquito Net Schemes: A Toolbox Manual For Managers

Authors. Dr Desmond Chavasse (London School of Hygiene and Tropical Medicine), Catherine Reed (PATH Canada), and Kathy Attawell (independent consultant)

Purpose of Activity

The toolbox manual will help managers from a variety of institutional backgrounds to plan and implement locally appropriate treated mosquito net schemes. The manual will include a detailed analysis of experiences and lessons from current programs in Africa, Asia, and the Pacific.

Description of Activity

In the past year, 23 operational treated net schemes were visited in 14 countries. During these field visits, information was collected through direct observation and semi-structured interviews with staff at different levels of the scheme and with key informants in the benefiting communities. By relating operational successes and failures to strategies adopted, it was possible to draw conclusions about the performance of different implementing tactics in a variety of socio-cultural environments. Detailed unpublished information was collected for schemes in another 12 countries either through postal questionnaires or interviews with visiting collaborators. The experiences and lessons learned from these schemes will be presented in a toolbox manual to be published in February 1998.

Findings

The toolbox manual begins by categorizing the wide range of types of scheme which exist and the different motivations for their initiation. These range from government-funded nationwide schemes implemented through existing semi-vertical malaria programs to a small privately funded net treatment service reliant on predominantly volunteer labor. The manual then outlines the process of assessing the feasibility of a net scheme in the context of a variety of objectives. The bulk of the manual deals with approaches to implementing different components of a net scheme under the headings *Planning and preparation*, *Technical issues*, *Operational issues*, *Social issues*, *Financing*, *Management*, *Sustainability* and *Operational research*. Throughout the text, relevant experiences and lessons learned from the survey of schemes will be presented in text boxes to illustrate the practical implications of adopting one approach over another in a variety of contexts.

The poster will present a selection of excerpts from the manual including a categorization of existing schemes, the steps involved in a feasibility assessment and a selection of experiences from schemes to illustrate different approaches to tackling common problems.

K-O TAB· A New Formulation for Impregnation of Mosquito Bednets

Organization/Author· AgrEvo Environmental Health, J F Invest

Purpose of Activity

Development of a simple-to-use unit dose tablet for impregnation of bednets

Description of Activity

With the increase in promotion of impregnated bednets for malaria control, there was need for a simple-to-use unit dose insecticide K-O TAB is such a product. It has significant advances over liquids, both in use and distribution.

Findings

Results are presented showing the laboratory and field efficacy of the K-O TAB which confirms it is at least equal to liquid treatment products

Lessons Learned

It is now possible to promote a formulation which is simple to use and also simple to distribute This will enable social marketing schemes to introduce bednet treatment on an individual basis

The Effectiveness, Cost, and Risk of Selecting Resistance with Different Pyrethroid Treatments

Authors C F Curtis, C A Maxwell, H Mbwana, M H Hodjati, I N Kasumba, and H M Kpendema (London School of Hygiene and Tropical Medicine)

Purpose of Activity

To optimize the technique of using pyrethroid insecticides for malaria vector control

Description of 3 Comparative Studies

- 1 Comparison in Tanzanian villages of lambda-cyhalothrin for bednet treatment or house spraying,
- 2 Comparison in Tanzanian villages of lambda-cyhalothrin and alphacypermethrin for bednet treatment
- 3 Comparison of the survival of laboratory strains of pyrethroid-susceptible and -resistant *Anopheles* mosquitoes when given the opportunity to feed on a human subject through bednets impregnated with various doses of two alternative pyrethroids

Findings from 3 Studies

- 1 Net treatment and house spraying have similar impact on vector populations and malaria incidence, insecticide and labor costs of spraying exceed the cost of nets, provided that the nets last several years and are not destroyed by rats
- 2 Data from a current trial indicate that both lambda-cyhalothrin and alphacypermethrin treated nets reduce vectorial capacity and malaria incidence, alphacypermethrin treatment of a net is reported from China to cost only \$0.06
- 3 200 mg permethrin/sq m kills more mosquitoes than 500 mg, because of greater irritancy of the higher dose, these doses do not selectively kill more susceptibles than resistance heterozygotes, preliminary data with 5-20 mg lambda-cyhalothrin suggest that these low doses, though more economic and wash-resistant than permethrin, may select more strongly for pyrethroid-resistant genes

Lessons Learned

The dose of 500 mg permethrin/sq m is widely considered the standard for net treatment, but it was arrived at without attention to comparative trials. Much can be learned about cost, effectiveness, and resistance risks from such trials.

Pyrethroid Resistance in *Anopheles gambiae s.s.* and Efficacy of Impregnated Bednets. First Results of a Field Trial in West Africa

Organization OCCGE (Institut Pierre Richet, Bouaké, Côte d'Ivoire) and ORSTOM

Purpose of Activity

To assess under field conditions the short-term efficacy of permethrin-treated bednets (Olyset) in a pyrethroid resistance area

Description of Activity

Olyset nets were distributed in a village of Northern Côte d'Ivoire (savannah area) with 80% coverage. Classical entomological and parasitological parameters were monitored one year before treatment and up to 16 months after. In this area, *Anopheles gambiae s.s.* was suspected to be resistant to permethrin (WHO filter paper test). Additional tests were made with other pyrethroids.

Findings

Pyrethroid resistance was confirmed with a wide range of cross resistance to DDT and all tested pyrethroids. The frequency of the *kdr* gene in the natural population was over 80%, mainly at homozygous status. Irritating effect of permethrin on adult anophelines was also dramatically reduced.

Even after 16 months of use, Olyset nets were still very effective on a susceptible strain of *Anopheles gambiae s.s.* (Kisumu) with 100% kill after 3 minutes exposure using WHO cones. On the other hand, mortality with the local strain (unfed females emerged from field collected larvae) was below 5% since the beginning of the trial.

Bednets had no detectable impact on biting rates, physiological age and transmission by *Anopheles gambiae s.s.* (*An. funestus* was not significantly involved in transmission in this area). Prevalence, gametocytic indices and spleen rates were even significantly higher 6 months and 1 year after treatment.

Lessons Learned

Because of resistance, permethrin has lost its irritating and killing effect on the local *Anopheles gambiae s.s.* field population. As a consequence, it is likely that pyrethroid resistance is at least partly responsible for the poor results obtained with impregnated bednets. This is a worrying situation since pyrethroid resistance is widespread at least over Côte d'Ivoire, Benin, and Burkina Faso, the only three countries investigated so far in West Africa. However, before drawing any practical conclusion, another field trial will be implemented in the same area, using classical polyester bednets impregnated with

deltamethrin or lambdacyhalothrin and achieving a better coverage altogether with a close follow-up of both compliance and morbidity. Detailed investigations on the effect of resistance on entomological parameters are ongoing in experimental huts (TDR project). The distribution of the kdr pyrethroid resistance gene in West Africa and throughout the whole of Africa should be investigated. Finally, a network for monitoring insecticide resistance in malaria vectors has been proposed in the framework of the Multilateral Initiative on Malaria in Africa.

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TREATED
MATERIALS

That you have to reach the mass market is a certainty! How best to do so is no longer uncertain

Organization Group Africa

Purpose of Activity

To provide information on face-to-face communications methods to marketers and other interested parties who need to communicate effectively and efficiently with communities that are difficult to reach in developing countries

Description of Activity

Face-to-face communication is the concept of taking a message through a real-time, live, interactive event or promotion to the target audience. The message is brought to life, allowing the consumer to experience first-hand the values of a brand, a service, or a community message in an enticing, entertaining, and interactive manner.

Group Africa has made a success of crafting face-to-face communication into a sustainable, efficient, and effective means of taking messages to consumers on an ongoing basis.

Findings

Impact of messages via traditional media

magazines	9%
TV	18%
newspapers	11%
radio	63%

Effectiveness of methods of communication

community gatherings	50%
rado	50%
leaflets	15%
TV	16%

Lessons Learned (Research conducted on effectiveness of face-to-face communications)

	Exposed Group	Control Group
A Communications content recall		
Total product intrinsics	91	68
Total product extrinsics	41	21
B Communication awareness		
Radio	93	85
Outdoor	69	43

Socioeconomic Factors of Treated Bednets Implemented through the Primary Health Care System in a Semi-Rural Area of Southern Mozambique

Organization/Authors M Dgedge, C Mendis, J Lines, A Gomes, A Mendis, E Streat, R Thompson, S Enosse, D Paulo, N Cuamba, B Hogh

Purpose of Activity

Insecticide treated nets (ITNs) have proved to be one of the best control tools for reducing malaria. However, it is not well established how the level of demand, compliance, coverage and equity would be affected by the socioeconomic circumstances of the community, the epidemiology of malaria and the price of ITNs. A study designed to determine how demand, compliance and coverage of ITNs is affected by socioeconomic factors started in 1996 in Boane district, near Maputo.

Description of Activity

The study involves about 6,000 households, very few of which had nets before. Cross-sectional surveys were carried out to generate baseline information on socioeconomic and demographic profiles of the study population, malaria prevalence, knowledge, attitudes and practices in relation to malaria. Malaria prevalence in the area is 60–70%. A preliminary survey suggested that 75% of householders would be willing to pay up to \$2.3 USD for a net. Rectangular nets were treated with lambda-cyhalothrin and sold at the health centre at the factory price (\$5.7 USD) for the family size and \$4.8 for the single size.

Findings

During the first six months 988 nets were sold to 624 households. The coverage was 40% in the high socioeconomic group, 14% in the medium, and 6% in the low group. In the low transmission season only 35% of households that had bought a net were using it, because of the low mosquito densities. 72% of nets bought were family size. 48% of nets were green, 35% brick and 17% white. High socioeconomic status families preferred the white nets, while the low preferred the green. Six months after net treatment, the insecticide was still effective, killing 100% of tested mosquitoes.

Lessons Learned

Purchase of treated bednets is income-dependent, and practice of sleeping under a treated bednet is season-dependent.

New Technology for Treating Bednets

Organization Insecta Sales & Research Inc

Purpose of Activity

Long-term efficacy of mosquito nets using the least amount of insecticide

Description of Activity

Bednets were pretreated using a new formulation of a pyrethroid insecticide. They were evaluated at intervals throughout the year and after washings for effectiveness against *Anopheles* mosquitoes. After one year, the nets were still effective.

Findings

The pretreated nets are still effective after one year and are giving 100% control of *Anopheles* mosquitoes.

Lessons Learned

Long-term efficacy of treated bednets can be achieved with a minimum amount of pesticide.

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Mosquito Nets by Mail Order

Organization: Save the Children Fund (UK), Zimbabwe

Purpose of Activity

To test mail order delivery system for sending bednets into rural areas of Zimbabwe

Description of Activity

Impregnated mosquito nets were advertised through various media and distributed by mail order. The payment system was either cash on delivery (with a small extra fee) or by payment up front.

Findings

Mail order is a potentially sustainable method of distribution of bednets.

Lessons Learned

Zimbabwe has no history of mail order marketing, but the idea appeals generally and seems acceptable.

Net Gain @PATH Canada

Organization PATH Canada (Catherine Reed and Sian Fitzgerald)

Purpose of Activity

The Net Gain Task Force is developing a reference centre for ITN programming and information dissemination, and will provide strategic technical inputs to projects and research, with a view to developing innovative and cost effective strategies for ITN interventions. Net Gain will contribute towards making ITN technology more sustainable, as well as more widely available and affordable. The Net Gain Task Force is working with local partners as well as individuals and agencies to overcome the prevailing lack of ITN application knowledge. It hopes that this will be of value to African Governments, international donors and programme managers to assist in defining and implementing sustainable ITN programmes. The initiatives of the Task Force will provide the foundation upon which a Net Gain Secretariat will be built.

Brief Examples of Activities

A. Information

Net Gain is developing a database from data supplied to PATH in response to a call for information, to provide a resource for programme planners or others. The information received and inquiries made will also play a valuable role in focusing the information included in the quarterly publication of *Malaria Matters featuring Netting News*, which will be distributed free of charge. The newsletter will also be available on the PATH website.

Net Gain is committed to continuing to help programme planners with procurement and distribution of the most appropriate nets, netting, insecticides or net treatment services for their needs. Net Gain will be updating information for publishing a 1998 version of the PATH Directory of suppliers of nets, netting and insecticide for SSA.

Net Gain, the book, provides valuable background for anyone working with treated nets in malaria control. PATH will be selling them at a reduced price of \$13 US during the conference.

B Good Labeling Practice

There is increasing interest in packaging and distributing insecticide in small quantities for home use by individuals or for use at communal net treatment sessions. But there is also concern about the standards of labeling and instruction. Net Gain will be working to promote good labeling practice of these insecticides. This will include endorsing a guide to good practice and certain standards to which manufacturers, suppliers and purchasers should become familiar and insist upon. This initiative will be developed jointly with major insecticide manufacturers and other interested parties.

FENDONA· Impregnated Bednets, Protection & Prevention

Organization American Cyanamid

Purpose of Activity

Bednets have proven effective barriers to mosquitoes but they do not control them. The application of a fast-acting insecticide, such as FENDONA, makes the net a lethal bait to mosquitoes, protecting both the user and the community.

Description of Activity

FENDONA is the fast-acting synthetic pyrethroid insecticide, alphacypermethrin. It combines high activity against insects such as mosquitoes with a low mammalian toxicity, making it an ideal partner for impregnating bednets. It is supplied as a water-based suspension concentrate.

To apply it, clean bednets are dipped into water containing a small measured quantity of FENDONA before being wrung out and dried. Because the amount of water a bednet absorbs is known, the correct dose of FENDONA can be easily calculated. (The suggested amount is 20-40 mg a $1/m^2$.) Once dry, the net is ready to use.

FENDONA has been successfully used in Gambia and China. It is currently being used in a large program in Tanzania, run by the London School of Hygiene and Tropical Medicine in collaboration with WHO.

Findings

The results with FENDONA-impregnated nets have been

- long residual activity on bednets, even after washing
- "mass killing" of mosquitoes
- lower sporozoite rates in mosquitoes
- reduced incidence of malaria parasitaemia in children
- reported additional control of bedbugs and headlice
- very low incidence of cough or runny nose by users

Lessons Learned

FENDONA used for bednet impregnation results in prolonged mass-killing effect on mosquitoes, reduced mosquito longevity, fewer cases of malaria, very high acceptance of the product by bednet users.

Economic and Social Aspects of Insecticide-Treated Bednets Used as a Malaria Control Measure in Rural Gambia

Organization National Impregnated Bednet Programme (NIBP) research team

Purpose of Activity

- calculate the cost-effectiveness of the NIBP
- ascertain the extent of bednet usage among children
- examine other reasons for bednet usage

Description of Activity (two NIBP cost centres were identified)

- I) Sensitization and awareness campaign
 - ii) Impregnation exercise
 - only NIBP implementation cost was considered
 - NIBP provided NO bednets, only insecticide for impregnation

Findings

The total cost of NIBP was D757,875 (US\$91,864) The cost is broken down as follows

- cost/death averted D4,946 93 (US\$599 59)
- cost/impregnated bednet D10 63 (US\$1 29)

Lessons Learned

- i) Treated bednets are cost-effective for malaria control
- ii) Households can be mobilized and trained to treat bednets, but this requires proper instruction or supervision
- iii) Regular use of bednets is an acquired behavior

A Modified Kerosene Lamp for Domestic Protection against Mosquitoes

Authors H V Pates, J E Miller, A J Keto, and J Lines

Purpose of Activity

The effectiveness of a cheap and easy method of household protection against mosquitoes was investigated in Dar es Salaam, Tanzania.

Description of Activity

Kerosene oil lamps of a traditional design were modified to heat the volatile synthetic pyrethroid insecticide transfluthrin (Bayer) in two different ways (1) the transfluthrin was simply mixed with the kerosene fuel at a concentration of 0.1%, as in a previous study in India (Sharma *et al* (1993) *Indian Journal of Malariology* 30: 169–176), (2) the insecticide was mixed with vegetable oil (0.1%), which was held just above the flame in a small can supported by a tripod. These two methods were compared with each other and with an unmodified control lamp in two series of human landing catches in a Latin Square design.

Findings

In the first series, the lamp with transfluthrin in kerosene was associated with a 27% reduction in bites, which was not significantly different from the control. Significant reductions in biting were observed with a locally purchased mosquito coil (38%), and with the insecticide in vegetable oil (54%). Increasing the concentration of transfluthrin in the kerosene to 1% did, in the second series of catches, produce a significant reduction in biting (44%). The reduction with the "tripod lamp" with 0.1% transfluthrin in vegetable oil was 78% in this series.

Lessons Learned

The tripod lamp is simple and cheap, it employs locally available technology. In places without regular electricity, it may offer a more cost-effective alternative to a mosquito coil, as a means of personal protection and a useful complement to a net for the early part of the evening before bedtime.

Issues in Sustaining a Community-Based Mosquito Net Intervention in Bagamoyo District, Tanzania

Authors M C Lynch, P Winch, C Shiff (Johns Hopkins University, School of Hygiene & Public Health), J Minjas, Z Premji (Muhimbili University College of Health Sciences, Dar es Salaam, Tanzania)

Description of Activity

This poster will describe the issues that have been encountered in trying to sustain a community-based system of net distribution and retreatment of nets after a USAID-funded study in Bagamoyo District, Tanzania ended in 1995. The mosquito net committees formed during the project are still functional, and money they collected from the sale of nets during the project period is still in the bank. The major issues have been 1) maintaining a supply of nets and insecticide at the village level, 2) securing political commitment at all levels national, regional, and district, and 3) creating demand for regular retreatment of the nets with insecticide. The poster will describe current operational research studies now starting that will investigate these problems.

Pyrethroid Impregnated Bednets for Personal Protection and Control of Malaria in Afghanistan

Organization/author HealthNet International (M Rowland and P Saleh)

Purpose of Activity

HealthNet International is an NGO that provides assistance in health care in the aftermath of crisis. Since 1989 it has coordinated an innovative malaria control programme in Afghanistan and in the refugee camps of Pakistan. Malaria became a major problem in Afghanistan in the 1980s, as a result of the Soviet war, the breakdown in the government health system, population displacement, and poverty.

Description of Activity

The pre-war strategy of indoor spray campaigns is no longer manageable or feasible. While the health system in the more secure areas slowly re-establishes itself, inhabitants have no choice but to resort to personal protection methods. Although there was little tradition of using bednets, a field trial in 1991 demonstrated that nets were popular with both sexes and all age groups, they were also effective, giving 61% and 42% protection against attacks of *P falciparum* and *P vivax* respectively. A programme to import and sell nets in Afghanistan (with a one-third subsidy) started in 1992. Distribution mechanisms include NGO clinics in more settled areas, and HNI mobile teams where there are no clinics.

Findings

To date, 200,000 nets have been sold, and an estimated 0.7 million people are now protected. Bednets are considered the primary malaria control strategy for the future. Owing to budgetary constraints, we normally limit the number of nets sold to any given community, but a study in two districts in which this restriction was lifted led to 70% of families buying our nets. A socio-economic survey conducted afterwards showed that the remaining 30% were probably too poor to afford nets. For such impoverished groups we have tried to develop cheaper alternatives. All Afghans sleep under their chaddors (Islamic face and body wraps) but these give little protection against mosquito bites. Tests showed treatment of chaddors with the repellent insecticide permethrin gave up to 50% protection against malaria with no side effects, and thus affordable protection is potentially available to most Afghans.

Lessons Learned

To improve sustainability we are expanding the distribution network to include private sector shops and clinics, and have commissioned agrochemical industry to produce single dose sachets locally. Revenue from the sale of nets and sachets is used to buy further nets. By diversifying the range of sales outlets to include the private sector we hope to increase local involvement in the programme, create work, stimulate the economy, and perhaps make the technique more sustainable.

Evaluation of the Ongoing Insecticide Impregnated Bednet Activities within Bamako Initiative Programme

Organization/author B A Rapuoda, D Lango, E Muchiri, J H Ouma, O Onyango

Purpose of Activity

The study's main objective was to evaluate the success of the ongoing insecticide-impregnated bednet project within Bamako Initiative and its viability as a long-term malaria intervention method

Description of Activity

A study was initiated in 1996 in Kisumu and Kwale districts of Kenya to evaluate the ongoing Insecticide Impregnated Bednets (IIBNs) activities within Bamako Initiative Programme. In Kisumu two Bamako Initiative programmes were studied. These include Kasongo-Masogo in W. Kabari sub-location which was the first Bamako to be established and Katieno-Kowe in Seme. In Kwale District the study was carried out in Mamba village.

A demographic profile was established by conducting a census survey during which the community population structure was determined. Households with children under 5 years old and also having bednets were identified.

The methods and tools used for data collection included the focus group discussion to obtain qualitative information, a fully structured questionnaire for quantitative information and an observation checklist to confirm the actual availability of bednets.

The study groups in which questionnaires were administered included households with children under 5 years old, with bednets. A control group consisted of households without bednets. The focus group discussions were conducted among the following five categories of people:

- a. Head of households (men) with IIBNs and those without IIBNs
- b. Community leaders
- c. Mothers of children under 5 years old with IIBNs and those without

The above groups were selected for various reasons which include the following: Household heads are normally men except in a few cases. They handle money and make decisions on what to purchase. Opinion leaders are usually elected by the community members, therefore they are a useful link for reaching the community. Bednet programs target pregnant mothers and children under 5 years, thus this was the best group to select.

The study focused on social issues related to prevention of malaria infection by use of IIBNs with regard to community members' perceptions or awareness, compliance, attitude toward bednet usage, re-impregnation, malaria episodes, and cost-effectiveness analysis. The extent of bednet coverage in the community was also determined.

Findings

- 1 Community members are aware that the use of bednets prevents insect bites 55% of household owners in the study had bednets
- 2 Community members are willing to buy bednets if they are affordable 59% purchased nets from Bamako Initiative sites
- 3 Of all households with bednets, 55% had insecticide-impregnated nets

Lessons Learned

The cost of the nets is a key issue to the viability of these bednet projects Therefore, ways of reducing and keeping down the cost of bednets and re-impregnation must be proposed

Annex 5

Summary of the Opening Plenary Statement by Tim Reiser, Aide to Senator Leahy

Annex 5 Summary of the Opening Plenary Statement by Tim Reiser, Aide to Senator Leahy

I first got interested in malaria by reading an article in January 1997 in the *New York Times*. The article described the magnitude of the malaria problem around the world. It was astounding to me that families could not afford a \$5 bednet which could save their children's lives seemed crazy.

I called USAID and was put in touch with Dennis Carroll, who was able to get Senator Leahy interested in the problem of infectious diseases—malaria being only one among many. We discovered that Congress had paid virtually no attention to this issue. Our investigation led to a hearing in our subcommittee in which we looked at the problem and tried to think what could be done about it. We knew that the government could not tackle the malaria problem alone. The private sector would have to be involved also. Working together, the public and the private sector could keep the costs of bednets low and solve the problems of distribution and demand creation.

Senator Leahy is also interested in landmines, but the problem of malaria dwarfs the landmine problems.

This year Congress decided to make available an additional \$50 million to USAID, the Centers for Disease Control, and other organizations to address the problem of infectious diseases. This conference now gives us an opportunity to find a way for everyone to work together. Congress wants the United States to play a major role in an area in which we have been too little involved. We will provide the resources so that USAID and other organizations can solve this problem.

Annex 6

“Give Us What We Want”

by
Valerie Curtis,
Jean-Bosco Ouédraogo, and
Jo Lines

INTERNATIONAL CONFERENCE ON BEDNETS & OTHER INSECTICIDE TREATED MATERIALS

Washington DC
October 29-31st

Background paper on the appropriate use of insecticide treated nets and curtains
to accompany the presentation on Oct 29th

By Valerie Curtis^{1,2}, Jean-Bosco Ouedraogo², Jo Lines¹,

GIVE US WHAT WE WANT!

"Yes, do sit down. Sorry about the mud, it's hard to keep the place clean when it rains. At least it's not so hot now. Yes, I did hear something on the radio about some 'medicine' to put on bednets. They said it was supposed to stop the children getting ill. Yes, it does sound like a good idea. But there's not much you can do about the fevers. My little one had a fever last week. It's the damp that causes it. They always get sick around now. Do we have a bednet? Yes, the children's father sleeps under one sometimes, when it's not too hot. He likes it because the insects don't disturb him. Us? We use a coil when we have the money, if not we burn some tomato leaves or orange peel. The coils get rid of the mosquitoes, but they give me a headache and they make the children cough."

"What do I think of buying a bednet for the kids? You must be joking! I have to buy them a bed first! I know someone who got the stuff put on her nets. She really liked it, everybody slept well, but it stopped working after she washed them. They told her not to wash them, but you can't leave a net more than a few weeks without washing it. Why not? I can tell you're not from round here! The kids wipe their hands on them, the smoke from the lamp makes them black. Only a real sloven would leave a net several months without washing it."

These are some of the things that mothers in Burkina Faso and in Tanzania told us when we asked them what they thought of insecticide impregnated mosquito nets. What they said raised fundamental questions in our minds about the IBN programmes we had hoped to set up. And we didn't have any answers to these questions. What do we do when children sleep on mats on the floor? What do we do if people don't think it is worth spending money on nets and insecticide? What sort of impregnation service should we offer if nets are going to be washed every two weeks? And how do we go about convincing people to use the nets, when they don't really believe that the fevers that they suffer from, have anything to do with mosquito bites?

The aim of this conference is to help us to develop insecticide impregnation strategies for the real world. We have gone beyond the days of the controlled trials of IBN efficacy, where we could get most of the inhabitants of a village to use impregnated nets by just giving them out. We are looking for sustainable solutions. This means that target populations will have to make the effort to procure nets, curtains, dipping and re-dipping for themselves. Whatever the type of IBN programme we are planning (health service based, NGO supported, commercial venture, etc), people are going to have to go to a lot of trouble to get and maintain IBNs. Buying or getting nets and curtains, maintaining them, washing them, getting them dipped and re-dipped requires not only time and money, but also a lot of determination. This paper argues that if we can't offer something that people can use easily and effectively, that is available, affordable and

attractive, then we will fail. In other words, instead of trying to bend people's behaviours to fit our technologies, we have to bend our technologies to fit their behaviour.

Treat your net, or else¹

Faced with difficult questions like the ones mothers in Tanzania and Burkina Faso set us, we only had two options. One was to close our eyes to these problems and to continue with our plan to set up impregnation services and to try to convince everybody in town that their children would get sick or die if they didn't all buy nets and impregnate them regularly. The second option was to try to get some answers to those questions, in the hope that we could come up with something to offer people that met their needs, that they could afford, and that they would find attractive enough to want to go about getting and using.

It seemed to us that we didn't really have any option. We had to address the questions posed by our target populations from the start. But is this practical? Can IBN programmes find answers to such questions? And can they use the answers that they get to design programmes that will make people determined to go out and get the technology of IBNs? This paper suggests that it is indeed possible to get answers to key questions about the usage of IBNs. And we suggest that putting users at the heart of our programme, designing programmes around what they do, need and want, is the only way that we are going to get IBN technology widely adopted.

Finding out about users

So the first step in setting up our IBN programmes must be to find out about our users. This laying of the ground work is often called 'formative research' (Lefebvre et al). We need to decide what we need to know about, formulate our questions clearly, and then decide how best to get the answers. Some of the questions we might want to ask are:

- What is the best insecticide to use?
- What is the best dosage?
- Who uses nets? Are curtains a better option?
- Should we provide a central dipping service, dip at home or sell dip-it-yourself kits?
- Which members of the household take the decision to acquire IBNs?
- What are the characteristics of our clients?
- What is going to make people want to acquire IBNs?
- What promotional strategies should we use?
- How do people usually find out about new ideas?
- How can we tap into existing channels of communication?

Once we have formulated a short list of key questions, the next step is to think up ways of getting them answered. This can often be quite simple. For example, a team in Dares-Salaam wanted to know which insecticide and what dose would be best for users. So they gave out nets with different insecticides and doses to groups of families and met with them once a month to find out what they thought. To their surprise they found that the nets had all been washed after eight weeks, despite all the injunctions not to. Mothers explained that they'd washed the nets in secret because they were so ashamed of the state of their nets. One said:

"since we are using kerosene lamps in just one to two weeks our nets need washing, even visitors will be surprised if you can wash all your other clothing while your net is black"

Another said

"They need washing, they are very dirty, you can get colds by breathing through it "

So what did the team do? They certainly didn't go back to the mothers and try to convince them not to wash the nets for six months. Instead, they started looking for the right dosage of insecticide to reapply after each monthly wash (Miller et al)

Formative research dear questions, simple methods

In Bobo-Dioulasso, Burkina Faso, we wanted to set up a commercial treatment service, and this required finding out certain things before setting to work on a full-scale programme. Our first step was to work out a short list of questions, then we chose simple, practical methods that could give us the answers. Some questions, such as the current usage of nets and curtains, could be tackled using a household survey, others required more in-depth discussion in focus groups, or with clients of the dipping service. For some questions, the only possibility was trial and error. Key to developing the plan was to involve residents who knew the town well, who could judge which techniques were likely to produce useful results and which not. The table shows the work plan that we used.

Some of our questions were relatively simple to answer. For example, the household survey showed that only 20% of people slept under nets, but that 81% of households had curtains. In focus groups women said that curtains were essential, otherwise "the house would look like a kitchen". We were told that nets have been falling out of use because of the rising costs. As a result, we decided to focus the programme primarily on dipping curtains rather than nets.

Slightly more difficult to answer, was the question of who our clients were. We asked participants in five focus groups (two with men and three with women) to tell us about who makes decisions about spending on household items and who goes out and buys insect sprays and coils. We learned that the male head of household generally decides about buying a net and finds the money for insect sprays and coils, but usually his wife would ask him to do it. Interviews with clients of the existing service confirmed that the men **had usually** made the decision to impregnate nets and curtains (Ouedraogo et al). So we took male breadwinners as our main target group and women as our secondary target group.

Objective	Questions	Research Methods
Potential clients	Who is the purchaser? What are the characteristics of clients?	Representative household survey Focus group discussions
Product	Curtains or nets? Which insecticide? What dosage? What frequency of dipping? In what format is the product offered?	Review experience elsewhere Pilot dipping service Bioassay Trial and error Client Interviews
Positioning	What will motivate the seeking of dipping and redipping?	Client interviews Focus group discussions
Place	Where to offer dipping?	Pilot central, satellite, domestic services
Price	What do people spend on mosquito control? What price will allow a reasonable return?	Client interviews Pilot dipping service
Promotional strategy	What channels of communication? What Logo/slogan? What packaging? What promotional materials and events?	Client interviews Focus group discussions Intercept interviews Trial and error

Table Formative research plan for the Bobo-Dioulasso insecticide impregnation service

The object of desire

Perhaps the hardest question to answer was the most basic one What would convince people to get up, go out, use their valuable time, spend their hard-earned money, to get IBNs for themselves? The success of our programme depended on getting a good answer to this question Again, the secret lay not with us, but in knowing the wants, needs and habits of the users

In Bobo we asked 20 clients of the existing dipping service why they had got their nets and curtains dipped Typical responses were

"It helps to get a good nights sleep"

"It gets rid of mosquitoes in the room"

"It gives you peace from the mosquitoes"

Not one of the clients said that they had used the dipping service to prevent malaria

Of course, no one likes being bitten by mosquitoes. All populations in Sub-Saharan Africa go to great lengths to avoid being bitten. In Dar-es-Salaam, Evans et al. asked people what they did about controlling mosquitoes at home. To their surprise, they were able to calculate that over a million dollars a month was being spent in the town on commercially bought coils, sprays and bednets. This expenditure was to combat the mosquito nuisance and had little, or nothing, to do with preventing malaria. The household survey in Bobo suggested that households were spending about \$9.00 a month on mosquito control on average (amounting to half a million dollars a month in total).

Findings such as these suggest that people want IBNs much more to counter the nuisance of mosquitoes than as a health technology. In Bobo-Dioulasso we have decided to drop the health argument entirely, and to concentrate on promoting impregnation to give the family peace from mosquitoes. Our reasons are the following:

- We don't think it is possible to explain about the relationship between *Anopheles gambiae* and malaria simply and convincingly to a large population. (Not to mention explaining about the different role of *Culex*.)
- Children will still get fevers, even if they sleep under nets, so the health argument will not be convincing.
- Negative messages trying to inspire fear of sickness are generally very poor motivators of behaviour change (Curtis).
- People are already spending a lot on mosquito control.
- Preventing mosquito nuisance is a simple, easy to understand and convincing message.

One result of adopting this strategy is that we have had to modify our product. If treatment of curtains and nets is being promoted to reduce mosquito nuisance then we need to find an insecticide and dosage which can produce an obvious impact on the mosquito nuisance. In a process of trial, error, client interviews and bioassays, we finally adopted deltamethrin on curtains at one and a half times the normal net dose (40mg/m²). This proved satisfactory at repulsing and killing *Culex*, which are the main nuisance biters in this urban setting.

Of course, our aim is still to prevent malaria. And nobody would deny that health education is a useful thing to do. Villagers who understand about malaria transmission are best placed to find solutions to the problem for their own localities and are key members of any product development team. Though many of our target users have heard that mosquitoes cause malaria, if you ask what caused the child's most recent bout of fevers, users explain that it is due to climate or wrong foods, like the woman in the example at the beginning of this paper. In the Bobo-Dioulasso region, for example, serious forms of malaria *Soumaya-ba* are thought to be due to sorcery or to curses from jealous enemies (Gbary). It is hard to see why people should want to change their longheld beliefs, just because they hear something else from the western biomedical belief system. So we are probably fooling ourselves on two counts if we rely on health education to motivate IBN seeking. Firstly, it is vain to think that we can get huge numbers of people to believe that mosquitoes are the main cause of malaria over a short time span. Secondly, even if we did have

the resources and the credibility to convince everybody that this was so, it is unlikely that this knowledge, on its own, would be enough to motivate people to seek out IBN technology

In the excellent 'Marketing for Dummies' (IDG 1997) Hiam suggests that one should never try to sell a product that can't be explained in five words (or an absolute maximum of twelve words) IBNs against mosquitoes is a simple and convincing message IBNs against malaria probably isn't

Having decided that mosquito nuisance was our primary argument for getting curtains dipped and re-dipped, we could then move on to developing a promotional strategy Again, this grew out of our formative research We asked about the channels of communication that our target audiences used and found out, for example, that we could reach about 67% of male household heads with a regular radio spot just after the evening news in a local language We used what we found out to develop a variety of promotional media, all using the same simple message, which we tested and re-tested in focus groups with potential clients

Some questions remain to be answered For example, we have not yet been able to assess whether home-dipping kits would be more acceptable than a central dipping service, but we will try this out as soon as kits become available

Formative research quick and cheap?

We saw then, in Bobo-Dioulasso, that it was possible to get useful answers to our questions relatively quickly and cheaply The field work carried out by a multidisciplinary team took only about two months, though the piloting and trial of promotional strategies took longer We have not, though, abandoned our research activities now that we have designed the programme on-going monitoring and evaluation will help us to continue to adapt to our clientele

Of course, not all programmes will have to do so much formative research themselves Conferences like this allow us to find some of the answers that we need in the experiences of other programmes But it will always be necessary to found programmes on an understanding of local users, their habits, needs and wants The key to doing this successfully is to formulate the key questions clearly and to make a commitment to finding out what people really do and think

Turning programmes inside out

However good we are at listening to our users, at adapting what we offer to their needs, and at finding strategies for convincing them to acquire IBNs we still can't expect overnight success It is bound to take a long time before a strange new innovation like chemicals on a bednet or on curtains becomes widely understood It will take even longer for people to see and be convinced of the advantages And then it will take a great deal longer before significant proportions of the population become dedicated dippers and redippers So widespread, sustainable IBN usage is a long-term goal, which is probably not achievable in just a few years It would be highly unhelpful to public health if, in our enthusiasm for IBNs we lost sight of other measures, such as prompt and correct treatment, which are still going to be vital for many years

If IBNs are to "take off" and be adopted on a large scale by populations at risk of malaria in the 21st Century then we have a lot of work to do In this paper we have argued that the only way to succeed is to put people like the women at the beginning of this paper first We need to put what they want, need

and do, at the heart of our activities. This requires turning our programmes inside out. Instead of trying to solve our problem (reduce malaria prevalence) we have to find ways to solve the users' problems. Instead of using our medical logic, we have to find out about the logic of ordinary people's lives. Instead of trying to force a new idea on people, we have to understand how to offer them something that they are going to want so much, that they will be prepared to go out and get it.

Bobo-Dioulasso, October 97

Endnotes

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Annex 7

Questions for Discussion by the Work Groups

Questions for Discussion by the Work Groups

I THEMES

A Demand

Subgroup 1 Assessing Demand

- a What should **Demand** include? Convincing people to use bednets or involving stakeholders in a decision-making role in shaping a community level bednet program?
- b What is the minimum information that a program planner needs to plan a strategy for demand creation?
 - at the individual/community level
 - at the regional/provincial level
 - at the national level
 - from the private sector
- c What tools and techniques can be used in each of these areas to accurately and efficiently measure demand?
- d What questions remain to be answered about demand creation?
- e How should the effectiveness of demand creation efforts be measured? what indicators should be used?

Subgroup 2 Approaches to Promoting/Sustaining Demand

- a Which mechanisms are typically most successful in promoting demand for bednets where benefits are more tangible? in promoting demand for personal insecticides where benefits are not necessarily so tangible?
 - What is the role of mass media versus person to person campaigns?
 - Should a program planner rely on individual demand or is a National Immunization Day model necessary?
 - What do people need to hear in order to properly motivate them? e g should we be creating demand for malaria control or a good night's sleep? How do you find out?
- b Are mechanisms/approaches to promoting demand in other sectors (e g family planning, water, child survival) relevant to creating demand for ITNs? In what ways? What do we have to learn from the experiences of other sectors?
- c To create demand for bednets, what should the message focus on?
- d What other options/vehicles for promoting demand deserve further attention and experimentation? For example,
 - Ways to link demand for insecticides for bednets to demand for agricultural (animal, horticultural) insecticides?
 - Ways to move from luxury product to product for larger market?

- e What do we want in the long term In 10 years, where should people be getting their nets? Their insecticides for net treatment?

Subgroup 3 Targets for Demand Creation

- a How do you target key groups such as policy makers, community leaders, program implementors and members of households? What other groups should be targeted? What do we know about appropriate strategies for each of those groups? What do we know about how to differentiate messages as part of these strategies?
- b What's the role of the private sector in creating/sustaining demand? What has worked? What's the role of the private sector in paying for demand creation? Where have there been successful efforts to engage government and private industry to fund and implement IEC programs? what worked?
- c What are the different roles that the national government can take in creating and sustaining demand? What are examples of actions taken by national governments that support demand creation? What policies should a national government adopt in order to facilitate demand creation?

B Affordability

Subgroup 1 Assessing Affordability at the Household level

- a What tools and techniques can be used by a program planner to gain a better understanding of issues of affordability at the household level, for example
 - What constitutes "affordability" for consumer? How much disposable income is currently going into health maintenance? How much into "bad" interventions?
 - How are priorities set for household expenditures? How can these decisions best be influenced?
 - How does seasonal availability of funds influence use for these kinds of purposes?
 - What constitutes consumer "willingness to buy?" How can this be assessed?
- b What has been learned about how to deal with affordability issues in households with demand for multiple nets?
- c How should the effectiveness of efforts to deal with affordability issues be measured? what indicators should be used?

Subgroup 2 Approaches to Affordability Issues

- a Are mechanisms/approaches to household affordability in other sectors (e g family planning, water, immunizations) relevant to bednets and insecticides? In what ways? What do we have to learn from the experiences of other sectors?

- b What other options/vehicles for dealing with household affordability issues deserve further attention and experimentation? What are examples of “creative financing” that could make the unaffordable more affordable?
- c What approaches should be considered that include utilizing subsidies for nets/insecticides?
 - Under what circumstances should nets or insecticides be subsidized?
 - What lessons have been learned about how the level of demand would change if bednets were distributed free, subsidized or sold?
 - If a government chose to subsidize the use of nets, what are different ways to subsidize? How could a government subsidize without actually spending money (e.g. tax incentives, eliminating tariffs)?
 - What are the long range costs to the government of subsidizing bednets and/or insecticides? What techniques should be used to determine this?

Subgroup 3 Private Sector Role in Increasing Affordability

- a Can the private sector increase the affordability of their products? Should manufacturers cross-subsidize for nets and insecticides? To what extent is this happening already?
- b Are manufacturers committed to developing this market?
- c What determines the price of Bednets? What are the actual cost factors (e.g. shipping)? What experience is there in identifying/pursuing ways to reduce these costs (e.g. buy in bulk, manufacture closer to user)?
- d What can be learned from experiences in work with other sectors about how best to structure relationship between donors, the government, and the private sector as demand for bednets and personal insecticides increases and the market develops?

C Accessibility

Subgroup 1 Assessing the Status of ITM Accessibility

- a What has been learned about the characteristics of existing distribution models that successfully ensure timely, affordable delivery of nets and insecticides? What currently works? Why does it work?
- b What are some simple, quick ways to assess the current level of bednet and insecticide accessibility?
- c What can the private sector teach us about distribution and sales in rural Africa? What is the role of the public and private sector in ensuring access? Does the commercial orientation of the private sector constrain its ability to reach poorer consumers?
- d What tools and techniques can be used to measure changes in consumer accessibility? What's a standard measure for accessibility for nets, insecticides, and treatment?

Subgroup 2 Accessibility of ITMs at the Household and the Community Level

- a What tools and techniques can be used to assess household accessibility of bednets? Which households have access? Who has access within a household?
- b Typically if a household has access to only one net, preferential use will be by the adult male(s), a generally low risk population. What approaches can be used to increase access by pregnant women and children, a higher risk population?
- c Men and women typically play different roles in the initial purchase and continuing treatment of ITNs. What has been learned about the role of gender in encouraging accessibility?
- d How should the effectiveness of efforts to deal with accessibility issues be measured? What indicators should be used? (coverage? use?)

Subgroup 3 Increasing Accessibility of ITMs

- a Of the distribution options presented in the paper this morning, which is most relevant for bednets? How would these options need to be modified to better accommodate a role for the public sector? for the community? for NGOs?
- b Can the same distribution scheme be used to deliver both bednets and personal insecticide? If not, what are the options?
- c Are mechanisms/approaches to household accessibility in other sectors relevant to bednets and insecticides? In what ways? What do we have to learn from the experiences of other sectors? What can be learned from the experience of the private, consumer sales-oriented sector?
- d Most distribution models would seem to favor those who are most accessible. What has been learned about how to create distribution models that serve areas beyond existing schemes? Should there be a differentiated role for the public/private sector in answering this question?

D Appropriate Use

Subgroup 1 Assessing the Appropriateness of ITNs as an Intervention

- a What information should be considered when assessing whether ITNs are an appropriate malaria control strategy in a given area? What tools and techniques should be used to gather this information? What criteria should be used to make the decision about whether ITNs are an appropriate malaria control strategy in a given area?
- b Is it sufficient for an ITN program to focus on individual access or is there always the need to develop a plan that has a community level impact?
- c What are appropriate measures of public health impact of ITN use? Some use the “percentage of target groups sleeping under adequately treated nets.” Is this a satisfactory measure?

- d Who has responsibility for doing some kind of measure? When? At what cost? What does it take to get a credible answer? How can impact be tracked? At what cost?

Subgroup 2 Assessing Proper Use of ITMs

- a What is the minimum information that a program planner needs to know about current practices related to the correct use of bednets and insecticides before planning an ITN program?
- b What tools and techniques can be used to assess current practices related to correct use of bednets and insecticides?
- c How can the correct use of ITMs best be tracked over time? At what cost? What indicators should be used?

Subgroup 3 Successful Approaches to Promoting Appropriate Use

- a What are the most successful approaches to promoting the appropriate long and short term use of bednets and personal insecticides?
 - What lessons have been learned by looking at existing users of bednets and insecticides?
 - What are the major behaviors that need to be taken into account when making choices about approaches to promoting appropriate use of bednets and insecticide? What has been learned about what approaches most successfully bring about behavior change related to bednets and personal insecticides?
 - In particular, what should the role of the community be in promoting effective use of bednets and personal insecticides?
- b What training components for promoters and educational components for users can best foster appropriate and sustained use of bednets?
- c Can an ITM program be implemented independently of other public health activities or does it need to be integrated with other public health activities? Have free standing programs been successfully implemented?
- d Are mechanisms/approaches to use and appropriateness issues in other sectors (e.g. family planning, water immunizations) relevant to bednets and insecticides? In what ways? What can be learned from the experience of other sectors?

II PROGRAMMATIC STEPS

Each group discussed

- 1 What is known about assessment (or planning, or implementation, or monitoring and evaluation, depending on the group), when putting together an ITM program?
- 2 What is not known, i.e., what questions remain to be answered?
- 3 What actions need to be taken over the next one to two years to move forward to address the outstanding questions about what is not known?